A CHILTON PUBLICATION

Iron Age

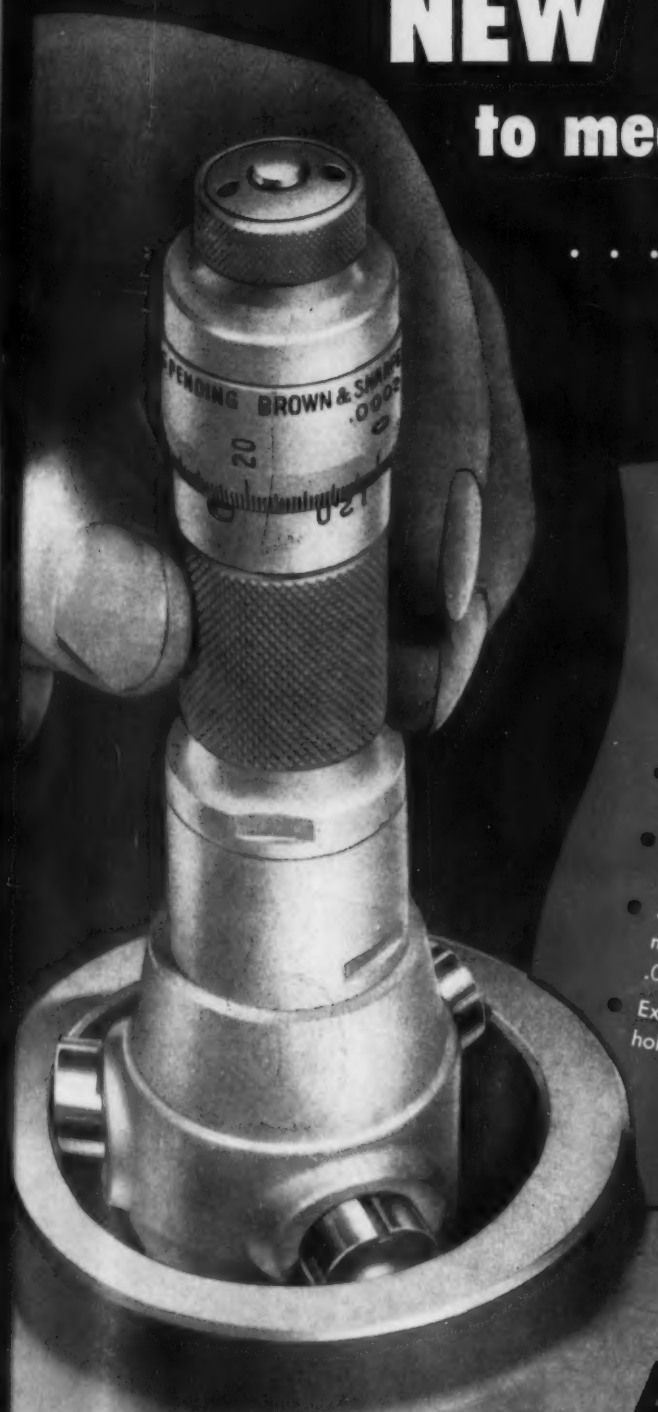
E NATIONAL METALWORKING WEEKLY

August 21, 195

22 1952
ENGINEERING

NTS PAGE 2

NEW WAY
to measure bores and holes
. . . directly— without masters!



INTRIMIK
Internal Tri-point Micrometer

- Measures any size hole within range of tool . . . eliminates need for many expensive plugs and setting rings.
- As easy to read as conventional micrometer . . . discloses exact amount of metal to be removed.
- Self-aligning, axially and radially . . . extremely rigid, no interchanging of parts (except for extensions).
- Sixteen sizes to measure from .275" to 4.000" . . . measures by .0001" on holes up to .500", and by .0002" on holes from .500" to 4.000".
- Extensions permit measurement of deep bores and holes.

Turn to page 39 for further information on Intrimik

WE URGE BUYING THROUGH THE DISTRIBUTOR

Brown & Sharpe BS

BROWN & SHARPE MFG. CO., PROVIDENCE 1, R. I., U.S.A.

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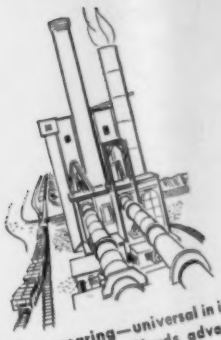


Worm gearing—universal in its application—affords advantages for almost every power transmission job.

The Cleveland-driven conveyor shown here is feeding dolomite into a rotary kiln at the Basic Refractories Plant at Maple Grove, Ohio.

Steady CLEVELAND drive keeps dolomite rolling along

TO move sized, chemically-treated dolomite to one of its rotary kilns for uniform dead-burning, Basic Refractories, Inc., chose this dependable Cleveland. In service more than 10 years, it has operated steadily, day and night, most of that time.

Cleveland is the worm gear speed reducer which assures smooth uninterrupted top-peak production. Backed by 40 years of industrial know-how, Clevelands are found in hundreds of manufacturing plants, operating huge dryers and kilns, belt conveyors, bucket elevators, mixers and agitators, in fact, wherever a fool-proof horizontal or vertical drive is desired—wherever steady production is the key-word.

So whatever your needs, consult the helpful Cleveland engineer in or near your city and see how Cleveland drives can help keep your production schedules rolling. Write now for new Catalog 400. The Cleveland Worm and Gear Company, 3252 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

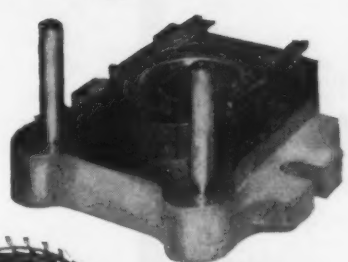
Tool Steel Topics

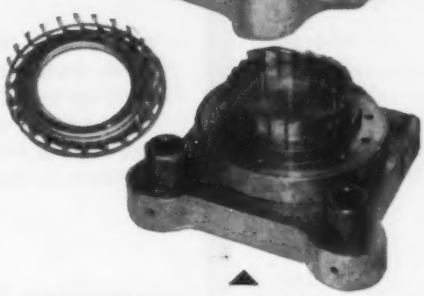
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BTR and LEHIGH H team up to form 24 teeth, punch 39 holes

addition to punching 39 ¼-in. holes, is four-station progressive die also per-rms a blanking and embossing opera-on on 11-gage hot-rolled steel. About 0,000 pieces are produced before the requires redressing. A sample piece shown below.





This die punches and forms 24 teeth in 18-gage cold-rolled steel and punches three ¼-in. holes. About 50,000 pieces are produced before redressing.

ow the outstanding properties of dif-erent tool steels can be used to best ad-antage is well illustrated by these two unching and forming dies.

One die punches and forms 24 teeth nd punches three ¼-in. holes, all in a ingle operation. The other die punches 9 holes of ¼-in. size, blanks out the iece, and embosses it.

The punches of both dies are made of TR, our manganese-chromium-tungsten il-hardening steel with a hundred and ne uses. It has plenty of wear-resistance, nd it takes the shock of the punching peration. BTR is easy to machine and eat-treat. And it's economical.

The die rings for both dies are made f Lehigh H, our general-purpose grade f high-carbon, high-chromium steel. This ir-hardening grade is first choice wher-ver it's essential to have minimum dis-ortion during heat-treatment. In addi-ion, Lehigh H provides long-wearing roperties for those long runs. You just an't get a better tool steel when you need ccuracy and long wear.

Both these Bethlehem grades are tocked in popular sizes by Bethlehem ool steel distributors in principal cities verywhere, and in our mill depot.

METALLURGICAL SERVICE — Bethlehem metallurgists are on call whenever you have problems. They'll assist with the selection of tool steel, or its heat-treatment, forging, grinding, machining, design, etc.

Sometimes it takes more than just good tool steel

In a customer's plant the other day we asked the shop boss the name of the tool steel he used for a blanking die which we saw in his shop.

"Sorry, but I just can't tell you. All I know is, it works fine. We used to have a lot of trouble with that die . . . and then one of your Bethlehem men came in here one day. He worked with the die all day, and he cured the trouble for good."

Later we checked with the toolroom and found that the grade used for the die was BTR, our general-purpose, oil-hardening tool steel — and a mighty reliable one, too. The fact that the superintendent didn't know its name was probably a compliment. It was doing a good job. He no longer had to worry about it. So the name didn't matter.

The point is, it takes more than the best tool steel to make some tools and dies work right. Sometimes what counts most is the service that goes with the tool steel — our vast experience in applying each grade, the sales service, metallurgical service, and distributor service.

"Service" is often a glib promise, an intangible sales point. But we at Bethlehem look on service as an inseparable part of our product, something that goes along with every bar of steel we ship.

BETHLEHEM TOOL STEEL ENGINEER SAYS:

Special treatment often permits using carbon tool steel

We have run across several customers who use carbon tool steels for tools and dies that others would ordinarily make from oil- or air-hardening tool steels. This is real economy.

The secret in most cases is in the design of the tool. Avoided are: sharp corners, small projections from heavy sections, numerous holes with both thick and thin webs. If the tool can be designed to minimize such hazards, carbon tool steel is often an effective solution.

When there are many holes in a die made from carbon tool steel, a good heat-treater will carefully pack the holes with asbestos or fire clay, then heat carefully and uniformly to obtain a well-hardened die. This precaution reduces distortion during heat-treatment and avoids causing cracks in quenching.

HEAT AND TEMPER COLORS SHOWN ON HANDY CHART

Want to estimate the temperatures of heated steel? Our convenient color chart is printed in natural tones; heat colors are accurately reproduced on one side and temper colors on the other. Write for your free copy to Publications Dept., Room 1042, Bethlehem, Pa.

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The Iron Age—DIGEST

Vol. 170, No. 8
August 21, 1952

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NEWS DEVELOPMENTS

FREIGHT CAR BUILDING PROGRAM OFF TRACKS—P. 57

Freight car building has ground to a standstill, braked by a strike-born steel shortage. Supply pipelines have been bled dry and it seems that output this year will not be a fraction of the goal. Many plants have been knocked out. Conversion steel is too expensive. Manpower troubles are seen developing.

MACHINE MAKES SHELL MOLDS FOR FOUNDRIES—P. 63

A Chicago firm is planning to sell shell molds to smaller contract foundries. New mold-making machine makes this possible. Company also plans to sell or lease the machines, allowing rental fees to be applied to purchase price. Machine can make up to 20 molds per hr with a maximum size limit of 12 x 18 in.

CANADIAN ALUMINUM CAPACITY EXPANDING—P. 64

Aluminum Co. of Canada last week put into operation the first of five new generators. All will be used to power new aluminum potlines. Complete system will yield 2,580,000 hp. or 1,925,000 kw, yearly to be used in producing 500,000 tons of the light metal annually. Most of output will be exported as ingot, pig.

STEEL LACK GROUNDS U.K.'s SHIP PROGRAM—P. 66

British shipbuilders have 7 million gross tons new shipping on order but not enough steel to do the job. In contrast with the heavy backlog, new tonnage laid down in the second quarter was only 205,641 gross tons, lowest since the war. More steel has been promised but rise is not likely to be more than 5 pct.

MAGNESIUM USE SHOWS PROMISE IN DETROIT—P. 74

Big increase in the use of magnesium in automobiles won't come overnight, but research and development work point to a bright future. Main obstacles so far have been cost and manufacturing difficulties. The light metal is in direct competition with aluminum, and has a 4 to 1 edge on zinc where weight counts.

HOW MUCH STEEL WILL CAR PRODUCERS GET?—P. 79

Washington this week is wrestling with the problem of how much steel to dole out to auto producers. Industry and labor ask for enough steel to make 3 million cars in first 6 months of 1953. DTA recommends 1,250,000 cars, 300,000 trucks for first quarter. Detroit also plugs for above-quota use of conversion steel.

of the WEEK in metalworking

ENGINEERING & PRODUCTION

REPUBLIC BECOMES NEW TITANIUM PRODUCER—P. 117
Republic Steel, which has been rolling titanium ingot for four years, now produces its own pure and alloy metal. Ingots are made either by arc or by induction melting. They are marketed in the form of strip, plate, sheet, and forgings. Republic's 7-pct Mn alloy has a yield strength between 120,000 and 160,000 psi.

HOW TO SELL AN INCENTIVE PAY CHANGE—P. 124
Timken Roller Bearing has a new method of presenting a change in the method of figuring incentive pay, in a manner acceptable to both management and workers. A change in method of paying chipping operators to a method based on weight, number of pieces, and amount of chipping required, was successfully sold.

PRECISE FABRICATION OF HEAT EXCHANGERS—P. 127
Good tube expanding practice is vital in manufacture of heat exchangers, vital components of a wide variety of equipment and processes. Five factors govern: Tube characteristics, tube sheet characteristics, tube and tube sheet preparation, workmanship, and the metallurgical properties of the steel selected.

ABRASIVE BELT MACHINE TAPERS AL PLATE—P. 130
A new method for producing the tapered aluminum plate becoming popular in aircraft construction involves an abrasive belt machine. As much as 0.01 in. of stock can be removed in a single pass, across entire width of a 72-in. wide plate. Finishing can be done on same machine, by simply changing belts.

REFRACTORY FIBER STANDS UP AT 2300°F—P. 133
Possible uses for a new ceramic refractory fiber are so wide that the potential market can't even be guessed at yet. One major use will probably be in industrial furnaces, where $2 worth of fiber at pilot plant price has the insulating value of $2.40 in high grade insulating brick. Fiber has many other uses.

COLD WORK CAN SOFTEN SOME METALS—NEXT WEEK
Cold working is a partially reversible process. A metal can be work hardened by plastic deformation of one type, and then work-softened, within limits, by plastic deformation of a different kind. Thus hard-worked metals can be softened by this method, without heating. Some heat treated steels are affected.

MARKETS & PRICES

NO POST-STRIKE HANGOVER FOR SCRAP MEN—P. 59
Ore shortage and anticipated record steelmaking rate firm the scrap market. Small tonnage desperation sales during the steel strike toppled prices but now ceiling prices have returned. On the dealer level, scrap collections have slipped. Major factor is loss of industrial scrap due to manufacturers' shutdowns.

U. S. STEEL PRICES RISE UNDER OPS ORDERS—P. 60
In line with OPS-approved price increases, U. S. Steel issued its company-by-company, product-by-product pricing lists this week. These lists are printed in their entirety by THE IRON AGE. Price increases are retroactive to July 26th. Per net ton increases depended on alloys, amount of finishing done on steel.

PASSING ON COST HIKES TO THE CONSUMER—P. 69
Shape of thing to come in government cost pass-on actions may be seen in new Office of Price Stabilization action involving manufacturers using steel, copper and aluminum. Provision for automatic pass-on of higher labor, transportation and material costs eases burdens caused by Capehart Amendment date.

TOOL BUILDERS GET SOME LEEWAY ON ORDERS—P. 84
Revised M-41 allows machine tool builders to give some help to main civilian customers, such as automobile makers and appliance firms. It will also let toolmakers pay some attention to decaying foreign markets. Critical list items and delivery dates may still be trouble. Industry sees no need for list.

CANADA'S STEEL SUPPLY, DEMAND IMBALANCE—P. 87
Predictions that steel product supply and demand would balance by the fourth quarter are out the window. The U. S. strike has cut deliveries. Canadian mills are benefiting. With a carryover of orders from the third quarter, bookings for the last 3 months will take up all output. Some shortages will linger into '53.

WASHINGTON FACES ORDEAL OF INFLATION—P. 155
The headsman's axe may fall on the neck of the administration's price control system. A skeleton OPS staff may not be able to administer the sweeping price relief order it is now planning. Meanwhile, metalworkers got the sad but official news of what steel increases are. Wage increases for some were also expected.

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SALT BATH BRAZING

...the fastest, cheapest production method!

✓ ***Work immersed in batches*** ... 5, 20 or 100 assemblies in each batch.

✓ ***All joints brazed simultaneously*** ... in seconds rather than in minutes.

✓ ***Decarburization of steel assemblies avoided***...no reheating needed. Clean surfaces assured for subsequent processing.

✓ ***No cooling chamber required*** ... no hydrogen atmosphere. 75% less floor space!

✓ ***First cost of equipment lower*** ... than any other production brazing system.

Ajax pioneered the salt bath brazing technique and proved that most ferrous or non-ferrous assemblies in production quantities can be brazed far faster and more economically by this method than by any other. Today this method is widely used by leading fabricators on a wide variety of work for brazing steel, cast iron, copper or aluminum assemblies.

In cases where a brazed assembly must also be hardened or carburized, the salt bath offers special economies because the brazing and hardening can be done simultaneously in a single heating operation.

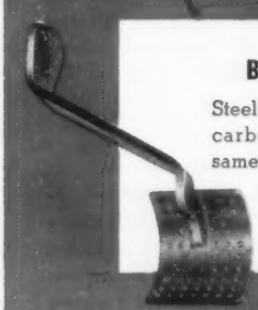
Let us braze a job batch of your parts in our Metallurgical Service Laboratory. See how much faster your work can be handled, how much your product can be improved. Write for details.

MAXIMUM PRODUCTION IN MINIMUM FLOOR SPACE!

180 steel bicycle forks per hour copper brazed in an Ajax Salt Bath measuring only 4" x 36" x 24"! Quenched directly from brazing bath into water.

58 ALUMINUM JOINTS BRAZED SIMULTANEOUSLY!

Aircraft cabin heater with 58 separate aluminum parts brazed in 10 min. Eliminated hand torch brazing formerly requiring 7 hrs. per unit. Thin aluminum sheets are brazed to structural parts 10 times heavier without warping.

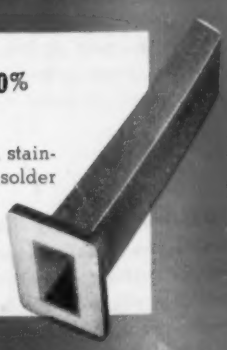


BRAZING COST: NOTHING

Steel starter pedal brass brazed and carburized simultaneously in the same Ajax furnace with one heating. Former method required two furnaces, one for brazing, another for carburizing.

REJECTS REDUCED FROM 70% TO ZERO!

Brass electronic wave guide with stainless steel flange brazed with silver solder in Ajax Salt Bath at 1350°F. in 1½ minutes, then air cooled. Rejects reduced to 0 whereas with previous methods, rejects ran as high as 70%.



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AJAX ELECTRIC COMPANY, Inc. 904 Frankford Avenue, Philadelphia 23, Pa.

THE WORLD'S LARGEST MANUFACTURER OF ELECTRIC HEAT TREATING FURNACES EXCLUSIVELY

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More Sales Ahead

BEFORE we drench the crying towel about the way business is going let's take a look a few years hence. No matter what happens there will always be things to sell and people to buy them.

Consumer business has been in a slump. Some of this slump is because of poor sales tools or laziness or forgetting the customer is kingpin. All companies are not guilty. Many have done wonders with an apparently hopeless market.

The more soft goods sell, the more heavier goods sell—eventually. Heavier goods are doing fine now but their time will come if planning and salesmanship wither. The air is blue over our ability to utilize new capacity and production techniques.

We have to get over the defeatist feeling that we are going to have too much for everyone. We are not going to have anything of the kind. We still have to sell to eat—or to move up our standard of living.

There is vast potential market coming into being for your products. Between 1940 and 1950 close to 32 million babies were born. About 12 million people died, which meant a net increase of 20 million people. But the 12 million who died are no longer consumers. They had a different pattern of buying than those who were born. Check what your kid has compared with what you had.

Between 1950 and 1960, 36 million babies will have been born. Counting births, longevity and immigrants and subtracting deaths we will have close to a 29 million net gain in population by 1960.

What does that mean to you? Maybe not much this year or next year, but when the vacuum created by the dearth of babies in the 1930's is past it will mean plenty.

It will mean: more roads, more houses, more schools, more milk machinery, more textile machinery, more refrigerators, more stoves, more capital goods to make these things and more of everything that is around you.

Don't give up. There is always a tomorrow, the potential is there and some of your new consumers are now throwing away their diapers. Be ready for them.

Tom Campbell

Editor

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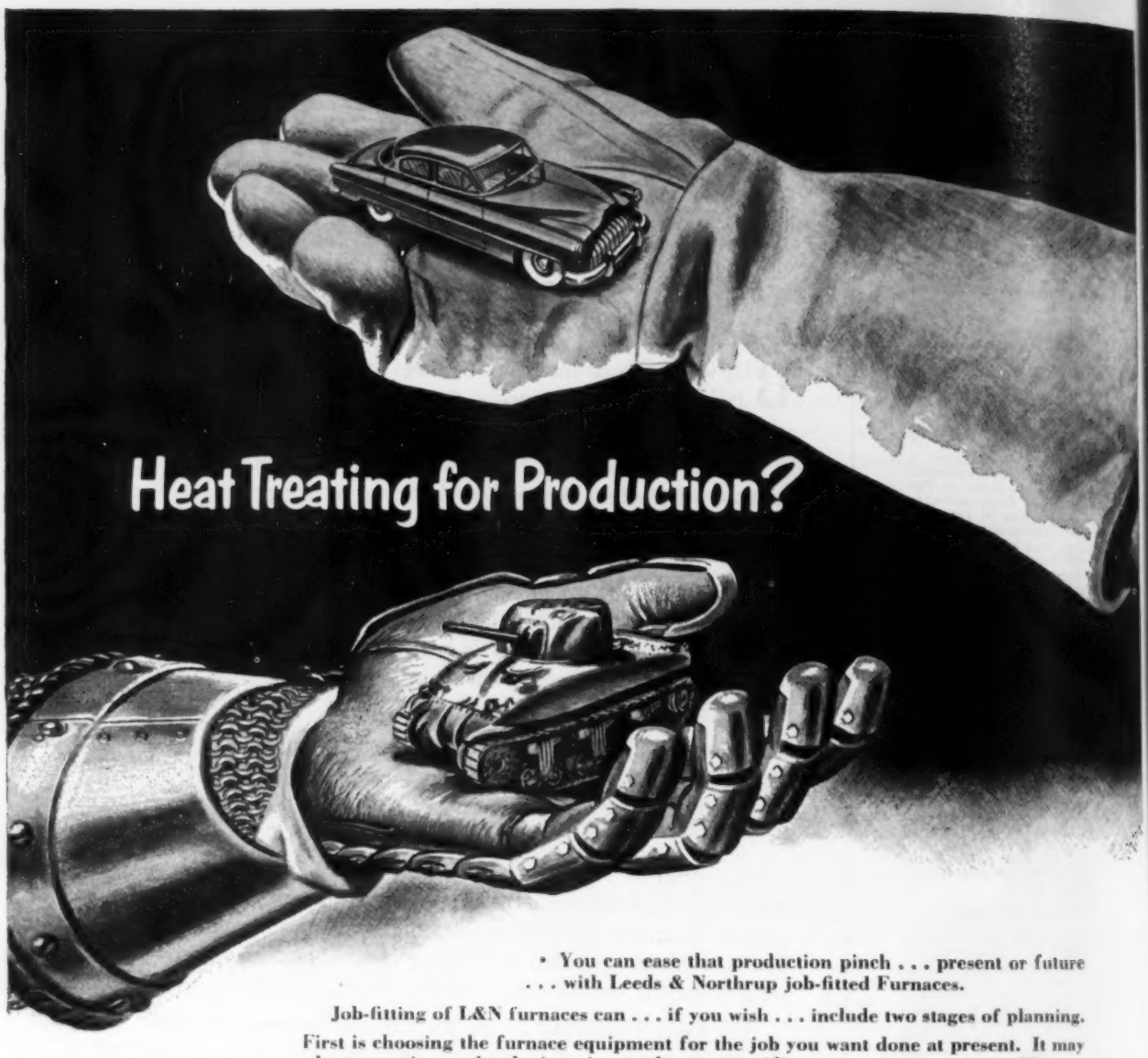


• You can ease that production pinch . . . present or future . . . with Leeds & Northrup job-fitted Furnaces.

Job-fitting of L&N furnaces can . . . if you wish . . . include two stages of planning.

First is choosing the furnace equipment for the job you want done at present. It may be tempering or hardening; it may be gas-cyaniding, steam treatment, nitriding or carburizing . . . on big loads or small; at high temperatures or low.

Second, what work will you be called upon to do in the future? With L&N equipment you'll be ready to meet the most exacting quality standards. You'll find it efficient for cost-cutting. You'll find it able to take the punishment of heavy loads, quick heating and round-the-clock use. With L&N furnaces you're ready . . . for today's *and* tomorrow's heat-treating problems.

For engineered job-fitting contact either our nearest office or 4956 Stenton Ave., Phila. 44, Pa.

Jrl. Ad T620(35)

LEEDS & NORTHRUP
instruments • automatic controls • furnaces

Big production for small space with L&N furnaces is due to high ratio of net to gross load; to compact design; and to thorough insulation. Furnaces are made in sizes for every parts heat-treating need, from smallest shop to largest plant.

With dense loads (as machine-gun clips shown here) Homo's streamlined heating passages, big heaters and blowers give fast, accurate, cost-cutting production.

With bulky parts Homo Furnace vertical construction, large size and ability to hold work either racked, stacked or on fixtures give ample capacity.

Dear Editor:

Letters from readers

Strategic Alloy Recovery

Sir:

Your July 3 article "Alnico Recovery Process" contains, we feel, some serious and misleading statements.

It is implied that producers of Alnico permanent magnets have been throwing away substantial quantities of critical materials with very little attention to consequences. This is definitely not true. It is also stated in the article that for the first time, beginning sometime in 1949, waste materials accruing in the manufacture of Alnico permanent magnets were reprocessed for recovery. Again, this is not true. There is a very considerable history of successful recovery of materials including nickel, cobalt and copper dating back to pre-World War II days.

During World War II the Alnico magnet industry used many cast off materials wherein nickel, cobalt and copper were available, in many cases in very impure forms, in order to continue the manufacture of permanent magnets. Impure substitutes and waste materials were used during the period that cobalt and nickel and copper were in extremely short supply. The processing of these nickel and cobalt containing residues was accomplished at great expense.

After World War II much of this recovery work was discontinued whenever it was economically unsound to recover material, but in no case have residues from this company ever been allowed to be lost, but rather they have been disposed of to cobalt and nickel where oxides of cobalt and salts of nickel could be economically produced from the residue.

In the interim this company produced about 5 pct of its alloys in 1947 from recovered materials, a percentage which has gradually increased until in 1951 the percentage of recovered cobalt was 36 pct of total usage.

More recently the Armed Forces have instituted standard conservation practices wherein turbine blade alloys, hubs, burner parts, etc., are returned to the several manufacturers for recovery as well as magnetron tube parts and other large permanent magnets are returned for reuse or recovery.

The writer does not intend to minimize the importance or success of the work described in the July 3 issue, however, it is extremely unfair to indicate that these metals have been lost when this company and, we feel, several other companies, have recovered very substantial quantities of material from grindings, dross, skimmings, as far back as 1947 through 1949 through processes substantially the same as described in your article.

S. L. FEDUSKA
Research Director
Thomas & Skinner Steel Products Co.
Indianapolis

Here is co-author Arant H. Sherman's reply: The article did not imply that producers of Alnico permanent magnets had been throwing away substantial quantities of critical materials with very little attention to consequences. On the contrary, executives of the magnet industry have been greatly concerned by the loss of considerable quantities of valuable metals, however, no single outlet or combination of outlets was of such magnitude as to make use of all of the Alnico skimmings and grindings which were a residue of the process of magnet manufacturing and large tonnages of this material were thrown into dumps for lack of any better outlet.

Being fully aware of this situation and having been encouraged by manufacturers of permanent magnets to develop a process whereby this material could be practically and economically reprocessed and returned to the permanent magnet industry we began our experimental work in 1949. We certainly did not wish to imply nor did we state that we were the first organization to attempt such a recovery program for the permanent magnet industry.

Mr. Feduska's letter points out that after World War II much of the recovery work was discontinued due to the fact that it was economically unsound to recover this material. Our process is such that it is economically sound and highly desirable to recover this material at any time regardless of fluctuations in the price of the virgin metals. This is true because at the present time the reprocessed Alnico, which we are turning back to manufacturers of permanent magnets, costs them less than one third the price of virgin metals.

Mr. Feduska further mentions that the Armed Forces have instituted standard conservation practices for turbine blade alloys, hubs, burner parts, etc. This is all well and good but it does not apply to the permanent magnet industry. Turbine blade alloys, jet manifolds and afterburners are primarily nickel chrome cobalt alloys, and as such, unsuitable for reuse in the permanent magnet industry as far as Alnico III and Alnico V metals are concerned.

We are reprocessing considerable tonnages of such obsolete nickel chrome alloys as well as nickel chrome alloys resulting from the production of these various defense items. Every pound of this material is going back into the iron and steel industry for further use as alloying agents.—Ed.

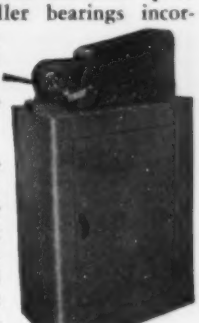
Precision
ROD CUTTING

at High Speed with the New di-acro
ROD PARTER

The DI-ACRO Rod Parters further increase the applications of "DIE-LESS DUPLICATING" as a cost cutting, time-saving production technique.

Do you require precision? — DI-ACRO Rod Parters hold tolerance to .001" on duplicated cuts. The ends are square, and roundness is maintained.

Do you want speed?—The Rod Parters exceed outputs of other methods with equal accuracy, on rods and bars up to 5/8". Torrington Roller bearings incorporated in an exclusive multiple leverage arrangement provide remarkable ease of operation.



DI-ACRO POWER PARTER

DI-ACRO Power Parter has air cylinder cushioned for quiet and efficient operation. Each cutting cycle obtained with 4-way foot valve—leaving operator's hands free.

GET "DIE-LESS DUPLICATING" CATALOG!

Shows parts duplicated by DI-ACRO Benders, Brakes, Shears, Rod Parters, Rollers, Notchers, Punches.

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Please send 40 page catalog including "Die-Less Duplicating" Engineering Service Offer.
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Customer Reports:

No Scrap Loss in Making Bushings of Asarco Continuous-Cast Bronze!

The Chain Belt Company of Milwaukee, manufacturer of famous "Rex" sprocket chains and construction machinery, finds that scrap loss is virtually eliminated . . . set-up and machining time cut drastically . . . by using Asarco Continuous-Cast bronzes in *exactly the length needed* for the machining of bushings. Chain Belt buys Asarco bronzes from the Badger Bearing Company (distributor) in Milwaukee to fabricate sprocket wheel bushings, and important parts of its Adjusta-Hite Moto Mixers.

Chain Belt also reports that the high tensile strength and uniform hardness of Asarco Continuous-Cast Bronze make this product far more suitable than ordinary bronze for applications in which resistance to hydraulic pressures is important.

Asarcon 773 (SAE 660) bearing-bronze is stocked by distributors all over the country. 216 sizes are available from warehouse stock in 105" lengths . . . tubular or solid round, in diameters from ½" to 5". The distributor will cut the bronze long or short to suit your requirements. Symmetrically shaped bars and tubes, special alloys and longer lengths up to 20' can be made to order.

Free illustrated catalog describing properties, sizes, weights, etc., is available on request.

ASARCO CONTINUOUS-CAST RODS · TUBES · SHAPES ®

These photomicrographs demonstrate the superior dispersion of constituents in continuous-cast alloys . . . also their freedom from porosity and other metal faults. (Alloy of 75% Cu, 5% Sn, 20% Pb shown here).

West Coast Sales Agent:
KINGWELL BROS. LTD., 444 Natoma Street, San Francisco, Calif.

American Smelting and Refining Company

OFFICES: Perth Amboy Plant, Barber, New Jersey
Whiting, Indiana

Fatigue Cracks

by Charles T. Post

A Proper Portrait

Mort Friedlander, editor of *The Foreman's Digest*, occasionally reprints articles from your f.f.j., and in appreciation of our cooperation passed this photo along to us.

Mr. Friedlander says, "Recently we wrote to Ford Motor Co for some photos. This was one of them. The point of my sending it on to you will become clear on close inspection. You will note that Henry Ford is holding a copy of THE IRON AGE. The date of this picture, I'm told, is 1914."

Then, as now, your f.f.j. was the bible of the metalworking industry.

Signs of the Times

We noted in a recent issue of the Bakelite employee magazine, *Tree Foil*, an employment questionnaire which the employees of today are sending to prospective employers. The questionnaire starts out with the statement:

"Please fill in all questions completely. Please type. (If you cannot afford a typewriter you cannot afford the wages I am accustomed to receiving.)" Later on we find the question, "Would you consider moving your plant to my home town?" "What is the maximum salary you will offer?" "What makes you think you have something interesting to offer?" "Why do you want to employ me?" At the end of the questionnaire there is a place for the signature of a Notary Public and the legal signature of the president of the company.

Too true! Too true!

War Is Hell Dept.

An obscure item in the Seattle *Post-Intelligencer*, forwarded by our West Coast spy, bares a new Army weapon that should make the enemy cringe.

According to the item "Seattle's 352nd Loudspeaker and Leaflet Company, the West Coast's only Army reserve psychological warfare tactical unit," has returned from summer training. We can see them, now, the boys of the 352nd, wiping the Cosmoline off their mimeograph machines, and turning their amplifiers up full.

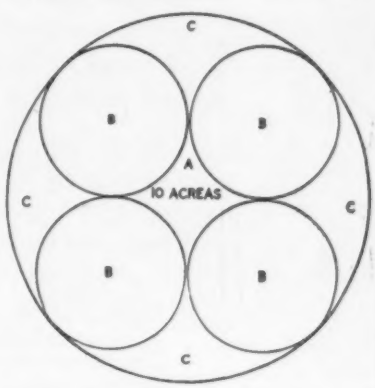
Puzzlers

In the baggage puzzler last week each passenger was allowed 100 lb of baggage without charge. As they each had excess baggage, 150 and 200 lb, respectively, they were charged at the rate of ½¢ per lb for the excess.

The race problem proved easy for M. E. Padin, Sam Tour & Co., Inc.; R. D. Hutchison and R. T. Wakefield, Piper Engr. Co.; C. E. Norton, Chicago; L. D. Rice, Timken Roller Bearing Co.; C. M. Houston, Moody Engr. Co.; C. B. Smith, Portland Copper & Tank Wks.; R. W. Huff, Canton, Ohio; and P. Napoli, American Machine & Foundry Co.

A. S. Foreman, Consolidated Vultee Aircraft Corp., has figured out the Indian puzzle of several weeks ago.

M. W. Hubbard, Mid-States Mfg. Corp., sent this one in a short time ago. An eccentric farmer who had an aversion to straight lines had a circular piece of property. When he died he willed the land to his widow, four sons and four daughters in the manner shown below. The widow received the section A, which was 10 acres. Each son received a section B and the daughters section C. Mr. Hubbard would like to know how many acres each son and daughter received and the total acreage of the original plot.



Is your washing machine cleaning brass, aluminum and zinc die castings as well as it cleans steel? Do the nozzles clog too often? Is there too much foaming?

Oakite has developed cleaning materials that meet every requirement for washing metal in every type of machine.

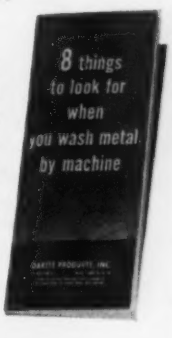
You'll want to read the Oakite booklet on washing by machine—16 pages of suggestions like:

¶ How to select the best detergent. When to use a solvent. When to use alkali. *See pages 4 to 8.*

¶ How to prepare metal for painting. *See page 9.*

¶ Tips on selecting and operating washing machines. Special instrument aids to better operation. *See pages 10 to 13.*

FREE For a copy of "*8 things to look for when you wash metal by machine*," write to Oakite Products, Inc., 30H Rector St., New York 6, N. Y.



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MATERIALS • METHODS • SERVICE

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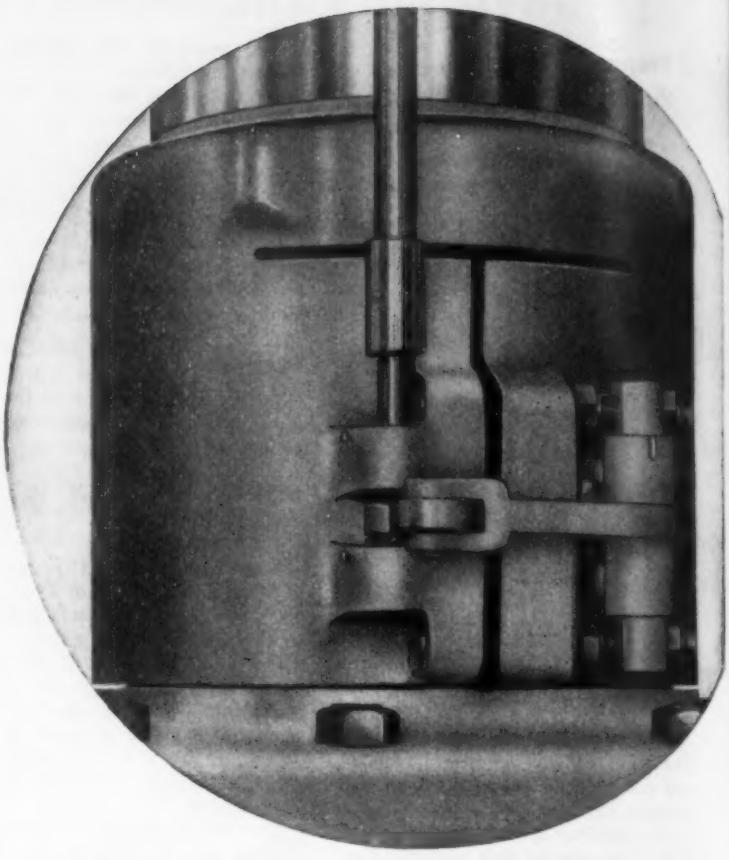


Now, powerful hydraulic arm and column clamping, operated by push buttons at the head, is standard, available on ALL Super Service Radials having column diameters from 11" to 26", inclusive.

This new feature on the smaller radial drills has been applied after many years of development plus 10 years of use on the large 22" and 26" diameter column machines which necessitate the most effective and powerful clamping that can be devised.

Step saving controls, all centralized on the SUPER SERVICE "clearview" head decrease machine handling time and increase accuracy and production.

Equal Efficiency of Every Unit Makes the Balanced Machine

Column clamping mechanisms are many and varied in design, but no other assures maximum power and effectiveness by providing;

1. The double draw bolt acting on hardened eccentrics.
2. Simple trouble proof hydaulically actuated clamp.
3. Push button controlled at the head on all of the SUPER SERVICE radial drills from the 11" diameter column to the 26" diameter column machines inclusive.
4. Uninterrupted column sleeve clamping surface is an integral part of the column sleeve, permitting stronger sleeve construction.
5. Stress proof column sleeve clamping area.
6. Less movement to the arm when clamp is actuated.

For further information on the distinctly superior engineering features of the SUPER SERVICE radial, write for booklet R-29 covering the 11" to 19" diameter column machines, and Booklet R-22 on the 22" and 26" diameter column machines.

RADIAL AND UPRIGHT SUPER SERVICE DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO. Cincinnati 9, Ohio U.S.A.

The Iron Age
FOUNDED 1855
News Section

FREIGHT CARS: Building Program Derailed

Strike-spawned steel shortage derails car building for rest of '52 . . . Many plants knocked out . . . Will help come? . . . Can't use conversion . . . Manpower trouble—*By J. B. Delaney.*

The steel strike has derailed the freight car building program for the rest of '52. Actual production of cars will be a fraction of program requirements. Car builders will still be struggling to shake off effect of the strike in 1953. Car shortages are cutting scrap movement this week in several areas, may hit other industries shortly. (See p. 162.)

Now, their activity is virtually at a standstill. The large builders —Pullman-Standard, General American Transportation, American Car & Foundry—have been forced to shut down practically all their plants. Others are scheduled to go down this month.

Help on Way?—National Production Authority is making a survey of the industry's plight. Presumably the plan is to determine seriousness of the problem as a basis for a program of relief in the way of more steel. The industry could use some help.

The position of American Car & Foundry Co. is typical. This company's Huntington, W. Va., plant was shut down June 21; its St. Louis plant about July 1; its Milton, Pa. plant, Aug. 1; its Berwick, Pa., plant will go down this month. These plants have a capacity of 2200 freight cars per month. When they will reopen is anybody's guess.

Another builder whose tank car and freight car plants have been closed since July 7 hopes to resume operations "sometime after Labor Day." This will be on a slow schedule at the start—about 30 pct of capacity. Further shutdowns may be necessary, depending on steel deliveries. It will take months to refill pipelines emptied by the strike.

What's Tight—One builder figures he will be lucky if he gets 40 pct of his steel requirements during the next 4 months.

Tightest steel items for the builders are bars and forgings. Others are structurals, sheets, and plates.

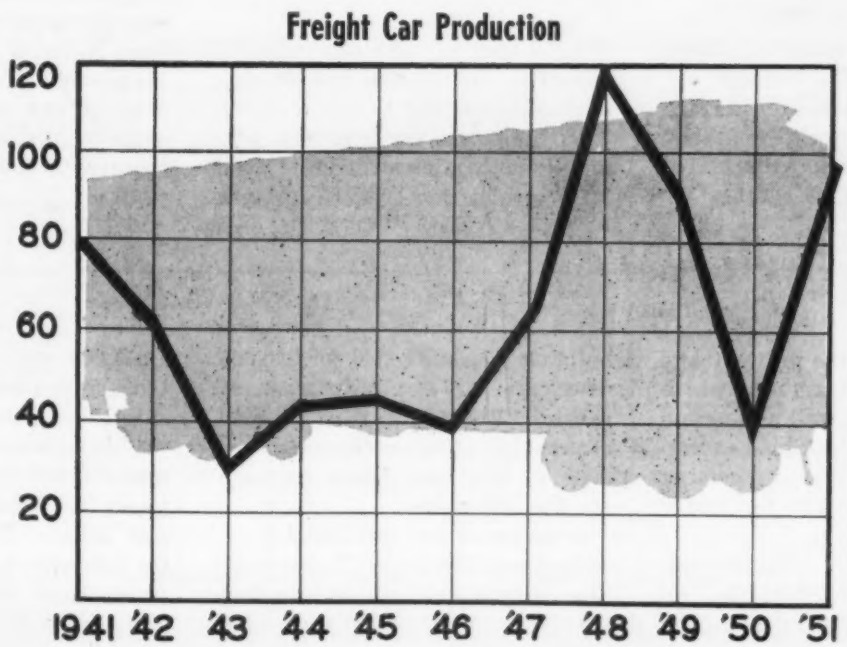
Unlike automobile and appliance producers, the car builders cannot afford to supplement their steel requirements through conversion or foreign channels. Fifteen tons of steel goes into the average freight car. Premium-priced material would skyrocket costs out of all proportion. The builders even shy away from warehouse steel.

The shutdowns also pose a serious manpower problem for the industry. When production is resumed it will find that many of the best workers have drifted into other industries. This will mean recruiting of new employees and intensified training programs.

No Change—Prospects of attaining Defense Transportation Administration's new goal of 11,000 cars per month are remote. The industry has a capacity to produce more than 12,000 cars per month, but this rate is not attainable without a full pipeline of materials and experienced workmen.

July deliveries totaled 5402 cars compared with 6411 in June. The industry's best month since the building program started was May 1951 when 9774 cars were delivered, a close approach to the old goal of 10,000 cars per month.

The industry has also been plagued by strikes in its own plants, by floods, and by inadequate steel allocations even when the mills were operating. Many of the items required for car building are in



UNIVERSITY OF MICHIGAN LIBRARIES

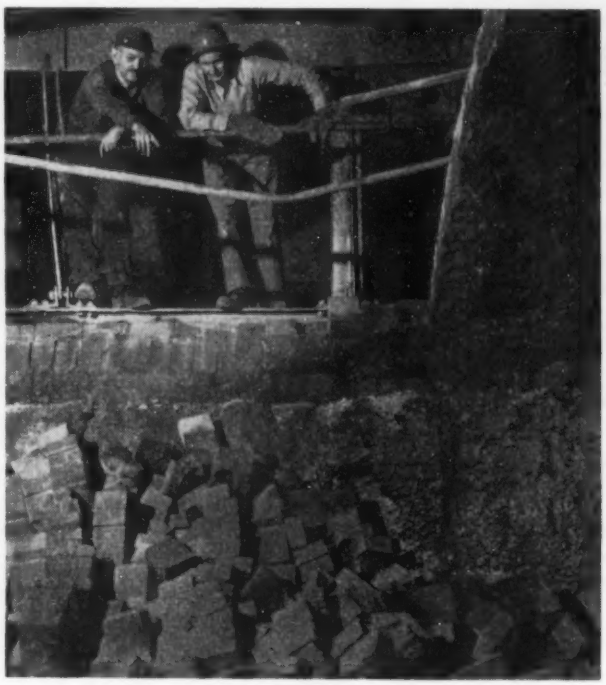
PIG: New Blast Furnace Going Up

New facilities for merchant iron and coke to be built near St. Clair, Mich. . . . Will benefit all foundries in state . . . Most pig now brought in from other areas—By W. G. Patton.

A new source of merchant pig iron in Michigan will be available early in 1954 according to Frank J. McLaughlin, president, Michigan Iron & Coke Co., Detroit.

The new Michigan firm is starting construction work on a blast furnace coke oven installation on a large site 2½ miles south of St. Clair, Mich. When completed it will be capable of producing 300,000 tons of merchant pig iron and 350,000 tons of coke annually. At capacity, the plants will employ approximately 250 to 300 workers.

Virtually all pig iron now produced in the Detroit area is used in the production of steel. Pig iron for the large automobile production foundries and many large and small jobbing foundries in Michigan has been imported from various parts of the U. S. and from foreign countries. Prices are much higher than going American prices.



DAMAGE: Steel strike damage to openhearth furnace at U. S. Steel's Gary works is surveyed. Roof of furnace collapsed during period of inactivity. Nearly a third of the company's furnaces have been so damaged and are now being repaired.

By Boat—Raw materials for the new blast furnace will be delivered principally by boat. Construction is being started on a new boat slip capable of unloading simultaneously two large Lake freighters carrying iron ore, coal, limestone and scrap metal. Charging materials will be delivered by conveyer belts from unloading hoppers on dock areas to the adjacent furnace and coke ovens.

Ability to deliver all raw materials by water or to use nearby rail or highway facilities, if necessary, should result in a low cost operation that will benefit all foundries in Michigan.

Expansion either to the west or to the south is possible on the large tract of land.

Plant will be equipped with the latest devices for catching flue dust and fumes. Water discharging into the St. Clair River will meet all Michigan stream pollution requirements.

It is estimated the new plant will cost in the neighborhood of $25 to $30 million. The company will be privately financed. Certificate of necessity has been received from National Production Authority providing for accelerated amortization and release to the company of the necessary materials required in the construction of the plant.

Special Report

Continued

heavy demand by the military and Atomic Energy Commission, which have first claim on mill production and which will be taking heavier-than-normal tonnages in coming months to compensate for losses due to the steel strike.

The car building program already is well behind schedule. As programmed 2 years ago, the building schedule called for 240,000 new cars, or a net increase of nearly 120,000 cars in railroad ownership. Car retirements of 5000 to 6000 per month accounts for the difference.

In terms of full mobilization requirements, Defense Transportation Administration is shooting for a goal of 2,167,000 cars, with 1,867,000 cars in the hands of Class I railroads. Class I ownership is estimated at 1,765,000 cars.

If DTA's new schedule is to be met, 296,500 cars must be built between last January and July, 1954, plus another 142,500 units during the following year. During the first 6 months of 1952, less than 45,000 new cars were delivered.

SCRAP: Confidence Stiffens Prices

Dealers, brokers sure of good future market . . . Ceilings return after strike . . . Industrial scrap collection sick . . . Reliance placed on greater role for scrap—*By T. Metaxas.*

With an unflinching eye any iron and steel scrap dealer or broker will tell you he has a future market whose spine is as strong as the steel his products go to make. The market is uplifted by the anticipation of unflagging demand from steel mills. Shortages of iron ore are expected to make fuller use of scrap imperative. The necessity for another era of record steelmaking operations to counter strike effects is certain.

Small tonnage, desperation sales of scrap during the steel strike toppled ceiling prices on steelmaking grades. When the strike ended these ceilings became deeply entrenched once more. Blast furnace scrap, a weak sister for many months, is clambering to ceiling levels. Even much-spurned cast is pushing for price increases.

Fresh Scrap Sources — Meanwhile steel mills own massive stockpiles of scrap. Some major mills have still to enter into full scale buying—partially perhaps because of unloading tieups. (Strict scheduling of freight car deliveries is routine in many mill scrap yards.) Although there is no genuine urgency in steel mill buying, purchasing agents are not eager to knock down prices. With price rises just placed into effect for steel products, many are content to let ceilings prevail.

On the dealer level, collections are declining. Hot weather does its usual job of lowering scrap processing. But the menace comes from another quarter: industrial scrap generation has been sapped by shutdowns of manufacturing plants because of inadequate steel supply. (About 9.6 million tons of industrial scrap were sold in '51.)

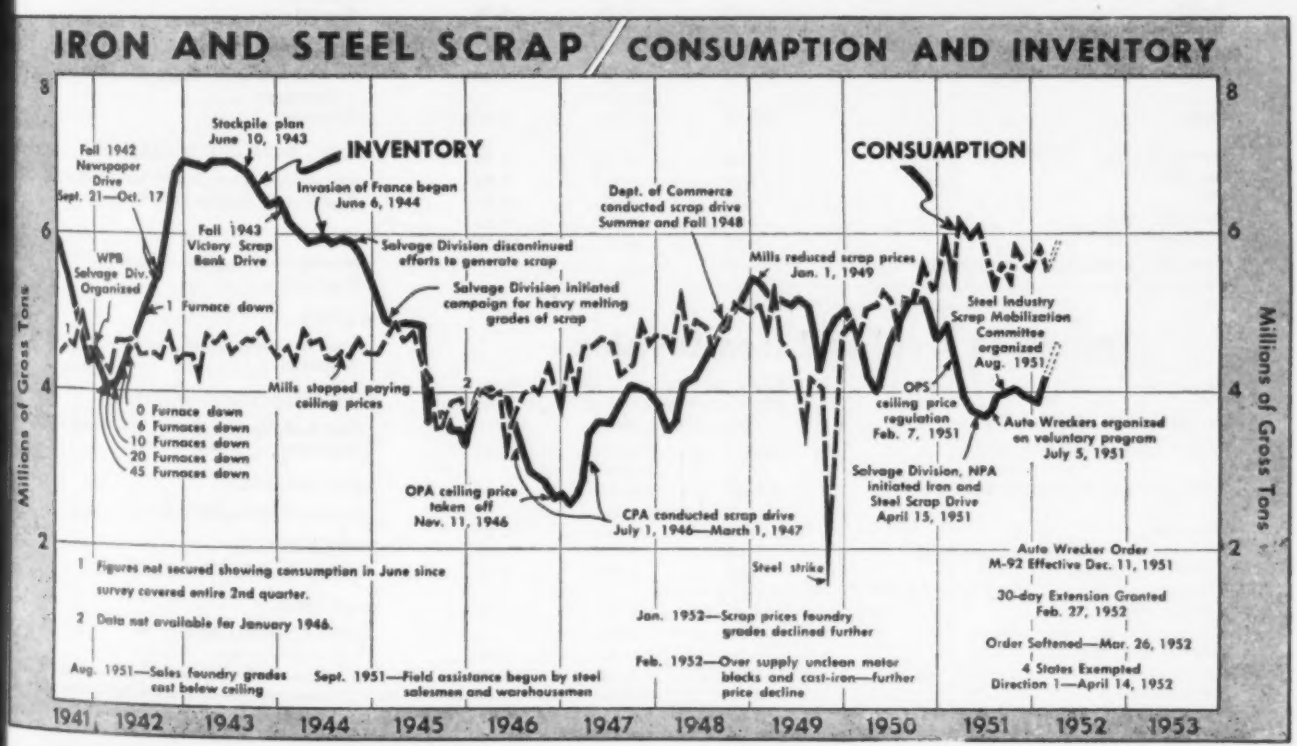
Dealers across the country report their yard stocks are leaner.

Turned the Trick — Tonic to scrap prices flattened by the strike is a mixture of confidence, old orders being worked off at ceiling, reluctance of mills to knock down prices, and storm clouds hovering over future scrap supply.

Much credit for recovery of scrap prices is going to iron ore shortages. But the real stimulus is the strike loss of about 19 million tons of steel. This will force mill operating rates to get high and stay high well into 1953.

Orders placed before the strike at ceiling prices extended into the post strike period. They furnished, to some extent, a price guide for a reviving market—even a relatively slow market for some centers.

Not Yet Healthy—Bullishness on cast is founded on the idea that a waning pig iron supply (ore trouble) will force more cast scrap on foundries. Some scrap men eye this optimism skeptically. Cast prices are rising despite sluggish movement of the grade. Dealers hold their cast rather than sell at "poor" prices. Foundries are buying cast as they need it—paying the higher prices demanded, but not buying much. Despite its front of price power, the tone of the cast market is not yet healthy.


IRON AND STEEL SCRAP / CONSUMPTION AND INVENTORY
INVENTORY
CONSUMPTION
Millions of Gross Tons
Millions of Gross Tons
Fall 1942 Newspaper Drive Sept. 21—Oct. 17
Stockpile plan June 10, 1943
Invasion of France began June 6, 1944
Fall 1943 Victory Scrap Bank Drive
WPB Salvage Div. Organized
1 Furnace down
Salvage Division discontinued efforts to generate scrap
Salvage Division initiated campaign for heavy melting grades of scrap
Dept. of Commerce conducted scrap drive Summer and Fall 1948
Mills reduced scrap prices Jan. 1, 1949
Steel industry Scrap Mobilization Committee organized Aug. 1951
Mills stopped paying ceiling prices
0 Furnace down
6 Furnaces down
10 Furnaces down
20 Furnaces down
45 Furnaces down
OPS ceiling price regulation Feb. 7, 1951
Auto Wreckers organized on voluntary program July 5, 1951
Salvage Division, NPA initiated Iron and Steel Scrap Drive April 15, 1951
OPA ceiling price taken off Nov. 11, 1946
CPA conducted scrap drive July 1, 1946—March 1, 1947
Steel strike
Auto Wrecker Order M-92 Effective Dec. 11, 1951
30-day Extension Granted Feb. 27, 1952
Order Softened—Mar. 26, 1952
4 States Exempted Direction 1—April 14, 1952
1 Figures not secured showing consumption in June since survey covered entire 2nd quarter.
2 Data not available for January 1946.
Aug. 1951—Sales foundry grades cast below ceiling
Sept. 1951—Field assistance begun by steel salesmen and warehousemen
Jan. 1952—Scrap prices foundry grades declined further
Feb. 1952—Over supply unclean motor blocks and cast-iron—further price decline
1941 1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952 1953

UNIVERSITY OF MICHIGAN LIBRARIES

United States Steel Co.

	(All figures cents per pound unless otherwise denoted) Old	New	Dollars per Net Ton Increase
CARBON STEEL PRODUCTS:			
Blooms, billets, slabs—forging	$66.00	$70.50 per net ton	4.50
Blooms, billets, slabs—rerolling	$56.00	$59.00 per net ton	3.00
Skelp	3.35	3.55	4.00
Bars and small shapes	3.70	3.95	5.00
Concrete reinforcing bars (new billet)	3.70	3.95	5.00
Standard structural shapes	3.65	3.85	4.00
CB's (Including CBL, CBJ and CB sections)	3.65	3.85	4.00
Bearing piles (CBP sections)	3.65	3.85	4.00
Sheet piling	4.45	4.675	4.50
Plates	3.70	3.90	4.00
Standard tee rails—No. 1 O.H.	3.60	3.775	3.50
Standard tee rails—No. 2 O.H.	3.50	3.675	3.50
Standard tee rails—All No. 2 O.H.	3.55	3.725	3.50
Light rails	4.00	4.25	5.00
Tie plates	4.50	4.775	5.50
Joint bars for standard rails	4.70	4.925	4.50
Hot-rolled strip	3.50	3.725	4.50
Hot-rolled sheets (18 ga. and heavier)	3.60	3.775	3.50
Cold-rolled sheets—commercial quality	4.35	4.575	4.50
Galvanized sheets			
Regular—10 ga.	4.80	5.075	5.50
Culvert—16 ga. copper bearing	5.60	5.875	5.50
Electrical sheets (electrical grade—cut lengths, 22 ga. price base)	7.25	7.85	12.00
HIGH STRENGTH STEEL PRODUCTS:			
USS COR-TEN STEEL			
Standard structural shapes	5.50	5.80	6.00
CB sections	5.45	5.75	6.00
Plates	5.65	5.95	6.00
Bars and small shapes	5.55	5.925	7.50
Hot rolled sheets	5.40	5.675	5.50
Cold rolled sheets	6.55	6.925	7.50
USS MAN-TEN STEEL			
Standard structural shapes	4.60	4.80	4.00
CB sections	4.65	4.85	4.00
Plates	4.75	4.95	4.00
Bars and small shapes	4.50	4.75	5.00
Hot-rolled sheets	4.45	4.625	3.50
USS ABRASION RESISTING			
Bars and small shapes	4.85	5.10	5.00
Plates	4.85	5.05	4.00
Hot-rolled sheets	4.75	4.925	3.50
ALLOY STEEL PRODUCTS:			
Blooms, billets, slabs—forging	$70.00	$76.00 per net ton	6.00
Ingots	$54.00	$57.00 per net ton	3.00
Hot-rolled bars	4.30	4.675	7.50
Bar shapes	4.55	4.925	7.50
Plates	4.75	5.25	10.00
Structural shapes	4.35	4.725	7.50
Strip, hot-rolled	5.50	6.10	12.00
STAINLESS STEEL (18-8) PRODUCTS: 4.7 per cent over current base price and extras.			

Tennessee Coal and Iron Division

	(All figures cents per pound unless otherwise denoted) Old	New	Dollars per Net Ton Increase
CARBON STEEL PRODUCTS:			
Forging billets, blooms, and slabs	$66.00	$70.50 per net ton	4.50
Rerolling billets, blooms, and slabs	$56.00	$59.00 per net ton	3.00
Wire rods	4.10	4.325	4.50
Hot-rolled sheets (18 ga. and heavier)	3.60	3.775	3.50
Cold-reduced sheets	4.35	4.575	4.50
Galvanized sheets			
Regular—10 ga.	4.80	5.075	5.50
Culvert—16 ga. copper bearing	5.60	5.875	5.50
Bars and small shapes	3.70	3.95	5.00
Reinforcing bars	3.70	3.95	5.00
Plates, carbon	3.70	3.90	4.00
Standard structural shapes	3.65	3.85	4.00
Standard rails	3.60	3.775	3.50

PRICES: U. S. STEE

Steel price increases authorized by the Office of Price Stabilization on Aug. 19 differ little from those recommended by industry representatives who conferred with OPS officials last month (THE IRON AGE, Aug. 7, p. 67). The ac-

Tennessee Coal & Iron Div.—Cont'd.

Light rails
Splice bars
Tie plates
Hot-rolled strip

WIRE MILL PRODUCTS:

Bright low carbon wire
Nails
Staples
Wire, merchant quality:
1. Annealed
2. Galvanized
Barbed wire
Woven fence
Bale ties

HIGH STRENGTH STEEL PRODUCTS:

USS COR-T

Hot-rolled sheets
Bars and small shapes
Plates
Standard structural shapes

American Steel

WIRE RODS, CARBON:

Donora, Cleveland and Joliet
Worcester

COLD-ROLLED CARBON STRIP:

Cleveland
New Haven

WIRE—MFRS. BRIGHT, LOW CARBON:

Cleveland, Donora, Joliet, Duluth, Rankin and Waukegan
Worcester

SPRING WIRE—HIGH CARBON:

Cleveland, Donora, Duluth and Waukegan
New Haven, Trenton and Worcester

NAILS:

Donora, Duluth, Joliet, Rankin
Worcester

STAPLES:

Donora, Duluth, Joliet, Rankin
Worcester

WIRE—MERCHANT QUALITY:

Cleveland, Donora, Duluth, Joliet and Rankin
Worcester

WIRE—BARBED:

Donora, Duluth, Joliet, Rankin

WOVEN FENCE:

Donora, Duluth, Joliet, Rankin

BALE TIES:

Donora, Duluth, Joliet

These prices for all companies listed above will
lists of extras and deductions and standard conditions
Delivered prices reflecting actual transportation
All sales are subject to seller's prices in effect
(All Column price increases are estimated.)

W LISTINGS

ual announcement (Revision 1, Supplementary Reg. 100, General Ceiling Price Reg.) describes some items in greater detail, fills in a few gaps in the original report.

The new prices are effective

Turn Page

4.00	4.25	5.00
4.70	4.925	4.50
4.50	4.775	5.50
3.50	3.725	4.50
4.85	5.225	7.50
Column 118	Column 127	9.00
Column 118	Column 126	8.00
5.70	6.075	7.50
5.85	6.225	7.50
Column 134	Column 142	8.00
Column 124	Column 133	9.00
Column 123	Column 132	9.00

EN STEEL

5.40	5.675	5.50
5.55	5.925	7.50
5.65	5.95	6.00
5.50	5.80	6.00

& Wire Division

(All figures cents per pound unless otherwise denoted) Old	New	Dollars per Net Ton Increase
4.10	4.325	4.50
4.40	4.625	4.50
4.65	5.10	9.00
5.15	5.60	9.00
4.85	5.225	7.00
5.15	5.525	7.50
5.90	6.275	7.50
6.20	6.575	7.50
Column 118	Column 127	9.00
Column 124	Column 133	9.00
Column 118	Column 126	8.00
Column 124	Column 132	8.00

ANNEALED		GALVANIZED		
5.70	6.075	.375	5.85	7.50
6.00	6.375	.375	6.15	7.50
Column 134		Column 142		8.00
Column 124		Column 133		9.00
Column 123		Column 132		9.00

apply on carload lots and are subject to the seller's of sale in effect at time of shipment.
charges to destination will be also quoted to customers at time of shipment.

Columbia-Geneva Steel Division

(All figures cents per pound, unless otherwise denoted)

CARBON STEEL PRODUCTS:	PITTSBURG Old	PITTSBURG New	TORRANCE Old	TORRANCE New	GENEVA Old	GENEVA New	Dollars per Net Ton Increase
Plates	....	.....	....	.....	3.70	3.90	$4.00
Standard structural shapes	....	.....	4.25	4.45	3.65	3.85	4.00
Bars	4.40	4.65	4.40	4.65	....	.....	5.00
Reinforcing bars	4.40	4.65	4.40	4.65	....	.....	5.00
Tie plates	4.65	4.925	4.65	4.925	....	.....	5.50
Hot-rolled sheets (18 ga. and heavier)	4.30	4.475	4.30	4.475	3.70	3.875	3.50
Hot-rolled annealed sheets (19 ga. and lighter)	....	.....	5.40	5.575	....	.....	3.50
Galvanized sheets							
Regular	5.55	5.825	5.55	5.825	....	.....	5.50
Culvert—16 ga. copper bearing	6.35	6.625	6.35	6.625	....	.....	5.50
Hot-rolled strip	4.25	4.475	4.25	4.475	....	.....	5.50
Cold-rolled sheets	5.30	5.525	....	.....	....	.....	5.50
Hot-rolled rods	4.750	4.975	4.90	5.125	....	.....	5.50
WIRE MILL PRODUCTS:							
Wire—annealed merchant quality	6.65	7.025	6.65	7.025	....	.....	7.50
Wire—galvanized merchant quality	6.80	7.175	....	.....	....	.....	7.50
Wire—bright basic	5.80	6.175	5.80	6.175	....	.....	7.50
Wire—M.B. high carbon spring*	....	.....	....	.....	....	.....	....
Wire—Premier spring	6.85	7.225	6.85	7.225	....	.....	7.50
Nails—non stock	6.90	7.35	....	.....	....	.....	9.00
Staples—non-stock	6.90	7.30	....	.....	....	.....	8.00
Nails—stock	Column 146		Column 147		....	.....	9.00
Staples—stock	Column 162		....	.....	....	.....	8.00
Barbed and twisted wire	Column 162		....	.....	....	.....	8.00
Woven wire fence	Column 156		....	.....	....	.....	9.00
Bale ties—single loop	Column 156		....	.....	....	.....	9.00
HIGH STRENGTH STEEL PRODUCTS:							
USS Man-Ten hot-rolled sheets	5.15	5.325	....	.....	....	.....	3.50
USS Cor-Ten plates	....	.....	....	.....	5.65	5.95	6.00
USS Man-Ten plates	....	.....	....	.....	4.75	4.95	4.00
USS Abrasion Resisting plates	....	.....	....	.....	4.85	5.05	4.00

* 4.7 per cent over current base price and excess added to invoice.

National Tube Division

PRODUCTS:	(Increases, in dollars per net ton)	(Discount or Reduced)
Buttweld pipe, black, plain end	$ 6.50	3¼ points
Buttweld pipe, galvanized, plain end	7.00	3½ points
Buttweld pipe, black, threads and couplings	7.00	3½ points
Buttweld pipe, galvanized, threads and couplings	7.50	3¾ points
Seamless pipe 2" to 4", black, plain end	10.50	5¼ points
Seamless pipe 2" to 4", galvanized, plain end	11.00	5½ points
Seamless pipe 2" to 4", black, threads and couplings	11.00	5½ points
Seamless pipe 2" to 4", galvanized, threads and couplings	11.50	5¾ points
Seamless pipe 5" and over, black, plain end	6.00	3 points
Seamless pipe 5" and over, galvanized, plain end	6.50	3¼ points
Seamless pipe 5" and over, black, threads and couplings	6.50	3¼ points
Seamless pipe 5" and over, galvanized, threads and couplings	7.00	3½ points
Oil country casing—grade H-40 and J-55	6.50	.....
Oil country casing—grade N-80 and Deepwell	9.00	.....
Oil well tubing—grade H-40 and J-55	11.00	.....
Oil well tubing—grade N-80	14.00	.....
Drill pipe—grade D	11.00	.....
Drill pipe—grade E	12.37	.....
Miscellaneous tubular couplings	33.00	.....

	(Base Price Increase)
Seamless and welded carbon mechanical tubing and seamless carbon pressure tubing—all classifications	5.5%
Alloy pressure tubing—schedule B-2	4.7%
Alloy pressure tubing—schedule B-3	5.0%
Alloy mechanical tubing—schedule J	5.0%
Alloy schedule J—bearing	6.0%
Alloy schedule K—aircraft	3.0%
Stainless steel tubing—all grades	4.7%

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WHEN

your gear specifications are tough do as others do—

Leave it to because:

Perkins *custom-made* **Gears** *are made by an organization which has specialized in this field for over 30 years—a company you'll like to do business with!*

PERKINS MAKES: bevel gears, ratchets, ground thread worms, spiral gears, worm gears, helical gears, spur gears with shaved or ground teeth.

NOTE: A new product—the PERKINS PRECISION SPRING COILER. This patented coiler turns out precision springs—any type, shape, size from wire sizes .005 to .125. Complete data and prices upon request.

with shipments made on or after July 26.

Among the items listed in greater detail are some 45 types of cold-rolled strip specialties ranging from bag ties to window regulator steel. The authorized advance for these grades is $31.50 per ton. The biggest increase came on razor blade steel, up $90.00 a ton. Increases of 4.7 pct were authorized on wrought iron. All carbon steel products not otherwise listed may be advanced 4.7 pct. Both of the latter increases are to be applied to the base price and extras.

Actual base price increases on major carbon steel products were more than the 4.7 pct figure commonly referred to as the size of the average increase. According to THE IRON AGE finished steel base price composite, base prices weighted on a historical basis were advanced by about 5.9 pct. But since extra charges remain constant in almost all cases, the total increase is about 20 pct less than 5.9 pct—just about the same ratio that extras are believed to bear to finished steel.

OPS has not closed the door on further changes. In issuing the regulation it said that its price-setters may take another look at authorized increases with a view to further modification. It did not say when it would take the second look.

Willys Plans Brazilian Plant

How do you say Jeep in Spanish?

This minor problem may be a by-product of plans just announced for the establishment of a Willys-Overland assembly plant in Sao Paulo, Brazil, for the production of Jeeps, station wagons, trucks and Aero Willys passenger cars.

Actually, the Jeep and other Willys units are familiar sights in Brazil already. Nearly 9000 units were sold to Brazilians in '51.

Plant is already under construction. It will be owned by "Willys-Overland do Brasil," a company organized by Willys-Overland Export Corp. and Brazilian distributors.

FOUNDRY: Shell Molds for Job Shops

Chicago firm plans sales to smaller contract foundries . . . Will also sell or lease its new mold-making machines . . . Can make 20 molds per hr . . . Uses 1-man crew—By K. W. Bennett.

A Chicago company is considering selling shell molds on a job-ing basis to smaller foundries in the Midwest. Molds would be made by Powdered Metal Products Corp. on a new machine which the company has built and tested in its own shop.

The firm also plans to market or rent the shell mold producing machine to foundries. As presently outlined, marketing plans would call for a $5000 deposit; then the machine would be used on a rental basis. Or the customer could use his deposit as down payment toward purchase of the machine. Similar merchandising methods have been used successfully on machine tools.

The company is also planning to supply a thorough engineering and maintenance service on the machines. They have even considered mixing sand and plastic and making this ready-mix available to users of the machine who lack mixing facilities.

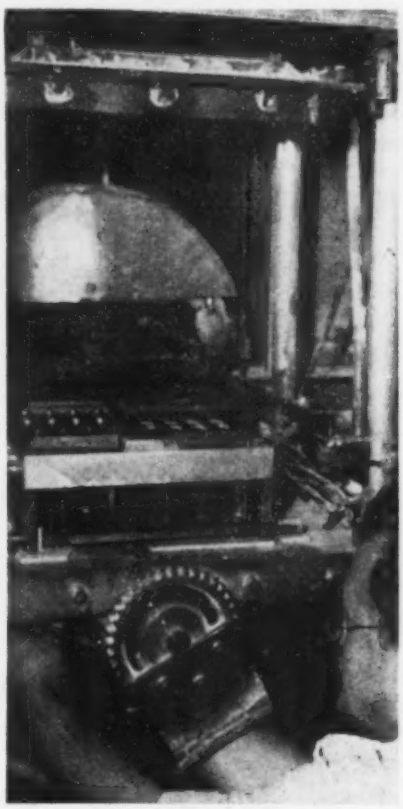
If these plans work out they will be another step toward making the advantages of the shell mold process available to small foundries.

In Operation — Pilot machine, designed by George Bachner, is being used by Powdered Metal in pouring small castings in high alloy and stainless steels. It is also being used in preparing molds for nonferrous castings. It has been operating in 12-hr runs during the test period.

The Bachner machine is capable of 20 "shots" per hr, presently handling a maximum mold size of 12 x 18 in. Melt shop in which the finished sand-and-plastic molds are used has two furnaces totaling 300 lb capacity, but will have sufficient production from the shell mold machine to farm out some of its molten metal pouring work to a neighboring gray iron foundry.

With an overall size of 6 x 12 x 11 ft, the shell molding machine is light, simple in operation, and would require a one-man crew when in full automatic operation.

How It Works—When the unit operates automatically the operator presses a starting switch, electric relays carry the machine through its cycle. Sand hopper and the die which will form the mold are suspended in a light frame that revolves around an axis through which all wiring also enters the machine. At the rear of the machine an infra red "furnace", slides over the mold die, curing the resin-impregnated sand mold in about 1 min. Full cycle for the machine is 3 min.



MOLDING: Die is inserted in Bachner shell molder. Complete with ejector rods and plate, it locks to lower carriage with bayonet studs.

Shell molding has, of course, certain limitations. The mold must be one that can be lifted apart, limiting the complexity of the parts that can be molded by this process. Molds are light, cannot stand a great deal of knocking about. But they can and have been trucked to other foundries for pouring. The company has considered doing job work on molds ordered by outside foundries, since shell molds can be used with conventional foundry equipment and need only be racked and clamped before pouring.

Electronics Contracts Available

About one-third of planned expansion of production capacity in three electronics equipment fields is available for handling by small business.

Items involved are Army and Navy type electrical connectors, high-voltage switchgear, and large electrical transformers. Defense Production Administration will receive applications for not less than 30 days from small firms.

Interim expansion goal set by DPA for Army-Navy electrical connectors is $7 million of new capital investment in added capacity by 1954, but only $1.1 million of expansion has not been applied for. Many of the applicants have set their sights on the 33 pct share reserved for firms with a maximum of 300 employes, Small Defense Plants Administration reports.

In the high-voltage switchgear field, including circuit breakers, switchboards, connectors, relays, compensators, and control apparatus, the goal in new investment is $50 million.

DPA has set the expansion goal for large transformers at 25 million additional kva of capacity in units with a capacity of not less than 100 kva each. Firms with no more than 1000 employes have a 34 pct share to apply for, with 11.5 million kva of capacity remaining open for application.

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ALUMINUM: Canadian Capacity Grows

Alcan starts first of five new generators to power pot-lines . . . Complete system will yield 2,580,000 hp to produce 500,000 tons of metal yearly—By *R. L. Hatschek.*

A 54,000-hp generator went to work last weekend, marking the climax of a huge North Woods expansion project. It was the first of five such generators to be put in operation at Aluminum Co. of Canada's new Chute-du-Diable power plant. Others will come in at 3-week intervals, bringing the total generated to 270,000 hp.

About 14 miles down the Peribonka River a second 270,000-hp power plant is also under construction. This is known as Chute-à-la-Savane and will use water flowing from the first dam. Water then flows into Lake St. John. From this lake the Saguenay River supplies energy for the 540,000-hp Isle Maligne power plant, the 300,000-hp Shipshaw No. 1 plant and the 1.2 million-hp Shipshaw No. 2 plant.

Total power developed by the completed system will be 2,580,000 hp, or 1,925,000 kw, most of which will be used in the production of 500,000 tons of aluminum annually.

Aluminum Capacity — Growing aluminum reduction capacity in Quebec, of course, is the reason for the huge power development. Last year Alcan produced some 445,000 tons of the light metal in this area. Early next year the district's capacity will reach an even 500,000 tons. This compares to 1.5 million tons of capacity which will be in place by the end of 1953 in the U. S.

Another 2 million hp of electric power are planned for the company's British Columbia plant. This will double potential Canadian aluminum capacity.

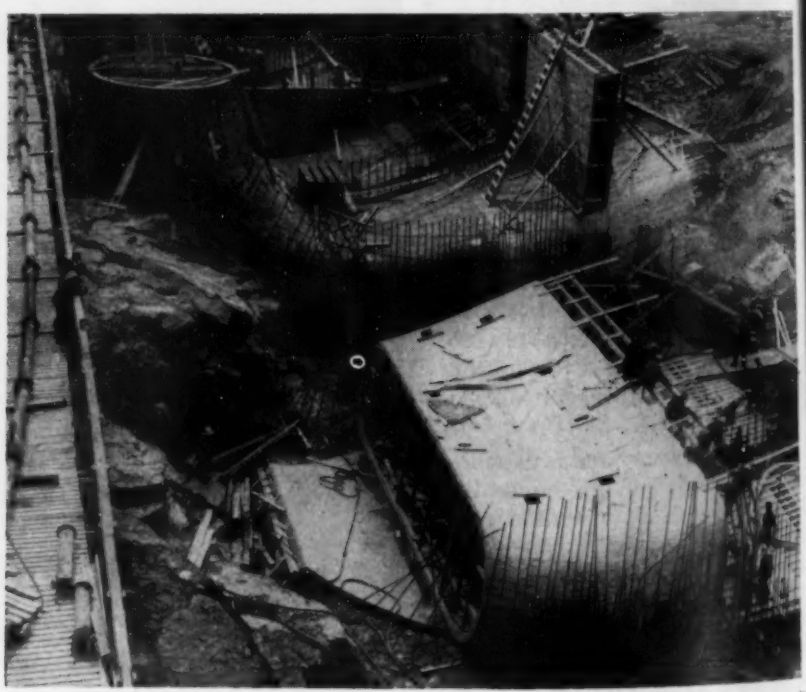
Canada, with its smaller population, cannot absorb such production. Hence the company exports most of its output—in ingot or pig form, though some is further processed.

Raw Materials—Saguenay district is a good example of integration. Bauxite is shipped from British Guiana to Port Alfred and a 5-month winter supply is stored there. It is then shipped by rail to Arvida, about 15 miles away. There it is reduced to alumina, which goes to smelters at Arvida, Isle Maligne, Shawinigan Falls and Beauharnois for production of metallic aluminum.

Other raw materials follow a similar path. Coke for carbon pot linings and anodes, fluorspar for synthetic cryolite and aluminum fluoride, and all the other necessities are brought here—to the power source some 300 miles northeast of Montreal.

Location—And all this is practically on the northern rim of civilization in Quebec Province. Construction of the Chute-du-Diable power plant was begun in November, 1950. Size of this installation alone is illustrated by the fact that 673,000 cu yds of rock were excavated and 343,000 cu yds of concrete were poured.

POURING PIG: Metal being poured from holding furnace into pig casting wheel.



CONCRETE HARNESS: View looking east showing the placing of concrete in intake unit at Alcan's Chute-a-la-Savane hydroelectric installation.

Building Walls of Stainless Steel

From a distance Equitable Life's Gateway Center skyscrapers in Pittsburgh have the conventional look. Go nearer and touch and you'll find that the "masonry" is metal-faced concrete-backed curtain wall. The idea is not new. Only a few blocks away a clothing store built in 1932 has roughly similar panels. But until the Equitable project, no structures have used wholly prefabricated wall sections complete in one unit for enclosing an entire structure.

Six basic units of stainless chrome steel-skinned panels were designed by architect firms, Irwin Clavan, and Eggers & Higgins. These had to meet big city building code regulations and be economical, durable, lightweight, and weather-resistant.

Here's how the panels are made: Stainless steel strips, 24 in. or less wide and 22 gage thick are brake-bent to needed shapes. Edges are turned in. Panel facings are made by spot welding sections together. These are backed by a 1 in. layer of porous (non-absorbent) concrete consisting of ⅜ in. screened aggregate bonded with cement.

Backing up this porous concrete layer is structural concrete (Perlite for this project). The Perlite is reinforced with 4 in. mesh wire and strengthening rods. Attachments are welded to the back-up. The stainless facing is then locked to the building.

BEST FACE FORWARD: Conventional-looking Equitable Life's Gateway Center skyscrapers are made of metal-faced, concrete-backed curtain wall. As of the present three steel-clad buildings have already been erected and five more are contemplated soon.

PREFAB PANELS: Pier elements of the stainless steel-clad panels are reinforced by a backup consisting of 4-in. wire mesh and ½-in. strengthening rods. Lightweight Perlite concrete is then poured over these to complete the panel.

CONSTRUCTION: The spandrels are slipped in between the mullions and piers. Measurements of the spandrels are 3 ft 10 in. x 5 ft 7 in. but are a scant 4½ in. in thickness.

PERLITE POURED: Pouring of concrete layer on back side of pier section finishes the backup. Completed panels have 4½ to 5-in. thickness. Total weight is close to 3½ tons.

BOLT AND WELD: All piers and spandrels are bolted to U-shaped brackets. Then brackets are welded to the spandrel beams.

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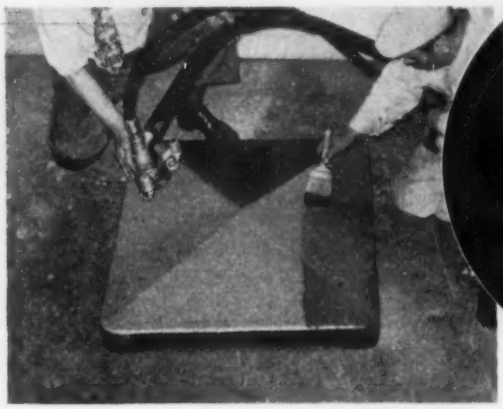
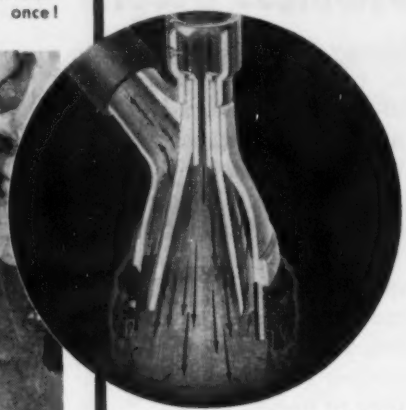
BLAST CLEANING

WITHOUT DUST OR GRIT

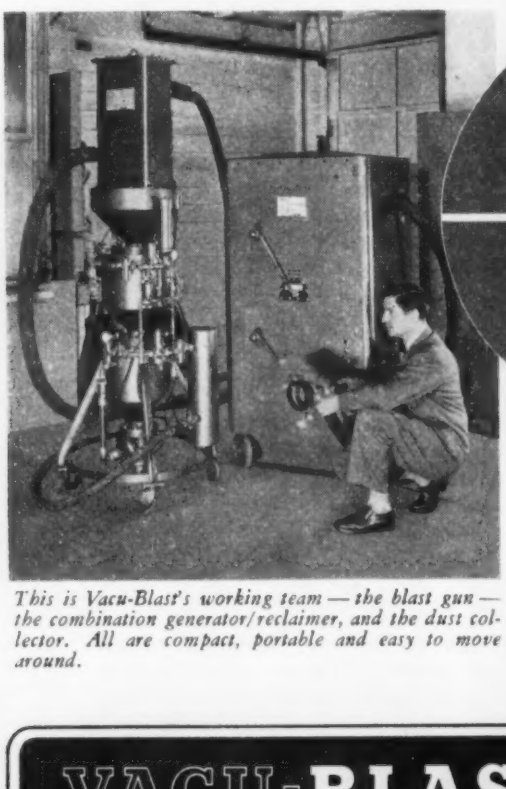
VACU-BLAST scours the surface, eats the dust and reclaims the abrasive — all at once!



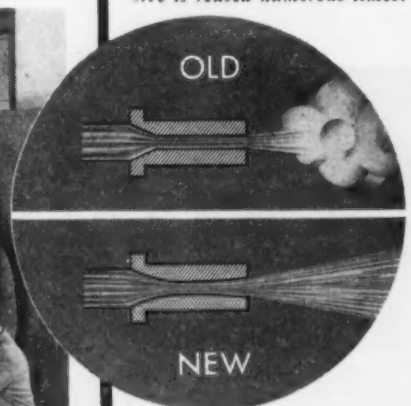
Right in the midst of your working shop, Vacu-Blast removes rust, paint and scale from metal, masonry and wood with a thoroughness and efficiency that only abrasive blasting provides. Surfaces are perfectly prepared for welding, painting or process requirements, yet there's no dust or scattered abrasive to interfere with other operations.



The abrasive, dust and debris are confined within the blast gun — they are picked up by Vacu-Blast's unique, patented vacuum return. The blasted surface is left clean and dustless. Your shop is protected from the nuisance of scattered dust and grit. Valuable abrasive is reused numerous times.



This is Vacu-Blast's working team — the blast gun — the combination generator/reclaimer, and the dust collector. All are compact, portable and easy to move around.



Newest Vacu-Blast improvement is the flared, high efficiency nozzle that does up to 25% more work per hour than previous nozzles. Developed through extensive research, the throat design of this new nozzle eliminates inefficient shock waves, resulting in full power flow of abrasive. This new nozzle is now provided on all Vacu-Blast equipment, and has been made available to all present users.

VACU-BLAST CO. INC.

468 PENINSULAR AVENUE, SAN MATEO, CALIF.

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SHIPS: British Yar

Have orders for 7 million tons of postwar low . . . Shipbuilders bl poor deliveries . . . More steel

British shipbuilders have no less than 7 million gross tons of new shipping on order. Value of the order books is $1.876 billion.

But in the second quarter of the year starts were the lowest since the war. New tonnage laid down was no more than 205,641 tons gross. For this anomaly the steel shortage is blamed. More steel has been promised for the rest of the year, but the increase is not likely to amount to more than 5 pct.

Unhappy—Shipyards are by no means satisfied. Current allocations, they claim, represent about half the amount of steel the yards could consume. Actual situation is worse. Yards do not always get what they are entitled to, and they claim that scant respect is paid to the need for deliveries in the correct sequence. In all, the industry is worse off for steel now than in the tightest days of postwar shortage.

Shipbuilders point to the damaging effect the steel shortage has on British national economy. While they have the orders, and cannot fulfil them quickly enough, other shipbuilding countries, especially ex-enemy Japan, and to a smaller extent, Germany, are forging ahead.

Decrease—Lloyd's shipbuilding returns show that British yards finished the second quarter with 2,076,241 tons gross of shipping under construction (37 pct of the world total), against 2,270,621 tons last Mar. 31. Decrease of 194,380 tons gross was distributed fairly equally between the stocks and fitting-out berths; at 1,572,340 tons the work on the stocks (or in process before keel-laying) was reduced by 101,406 tons, and fitting out (503,901 tons) by 92,974 tons.

Decrease is partly due to the unusually small tonnage laid down

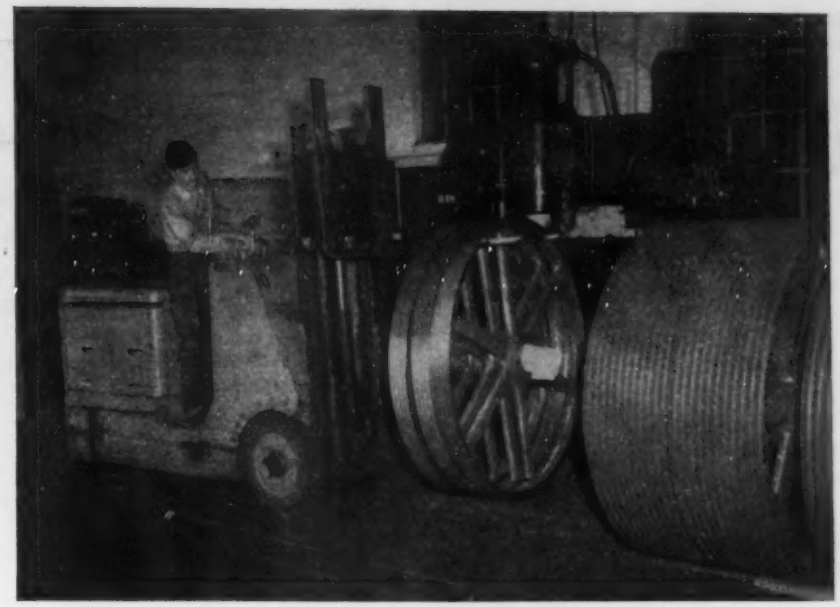
ed Steel

ls, but second quarter starts hit shortage, point to low quotas, promised but it won't help much.

in United Kingdom yards during the quarter, the lowest figure since the war and only 19.4 pct of the world total. A complementary factor is to be found in the quarter's exceptionally heavy completions. But owing to corresponding activity abroad, U. K.'s 405,600 tons formed only 35.8 pct of the world total. Tonnage launched, 309,018 tons, formed 33.6 pct of the world total.

U. S. Leads—Among shipbuilding countries outside Britain, the United States continues to lead in the quantity of shipping under construction. Japan, where no less than 170,143 tons of shipping was begun during the quarter, now takes third place among the world's shipbuilders, with 456,633 tons. Japanese tanker building was increased from 177,180 tons to 302,550 tons, and now represents 66.2 pct of all the work in hand. Other leading countries are Germany, with 405,806 tons, Holland, 402,082 tons and France, 389,330 tons.

In British yards the volume of tanker work fell from 1,285,000 tons on Mar. 31 to 1,130,486 tons gross at June 30, 54.4 pct of all the shipping under construction in this country, and 44 pct of all the tanker shipping under construction in the world. On the other hand, tanker work outside Britain expanded by nearly a quarter of a million tons to a record level (445,899 tons).



Characteristics That Precisely Fit the Needs

A material-handling industrial truck makes as many as 45 stops and starts per minute—ahead, back, up, down. For operating efficiency, it requires instant power for starting and acceleration but should consume no power during the stops and the preceding coasting and braking intervals.

The kind of power that precisely meets these needs is ELECTRIC POWER supplied by an EDISON Nickel-Iron-Alkaline Storage Battery and applied by a high-torque d-c ELECTRIC MOTOR through instant on-off controls. And the battery-charging current, produced wholesale by a central station, is the lowest-cost power available.

EDISON batteries have cells of steel, an alkaline electrolyte that preserves steel and foolproof operating principle. They accept charge rapidly; are not injured by overdischarging . . . by freezing . . . by standing idle . . . by short-circuiting, reverse charging or other electrical accidents. They are the longest-lived of all types of batteries—so long lived, in fact, that they make big savings in depreciation costs per year. They are so trouble-free that they not only cut maintenance costs; they prevent unscheduled down-time of the truck. When exchanged at convenient intervals, they afford round-the-clock power for the truck with the nth degree of dependability.

ELECTRIC MOTORS bring to industrial-truck operation the same trouble-free dependability that they afford in stationary machine drives. They also give quieter, cleaner, safer truck operation than any other kind of power. For more information send for free copy of our bulletin *Modern Material Handling* which analyses the power requirements of handling work. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. Thomas A. Edison of Canada, Limited, Montreal.

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LABOR: Nobody Gets Any Younger

Rising average U. S. age means industry will be hiring older workers . . . Contrary to traditional business belief, there are definite advantages in the policy—*By W. V. Packard.*

Nobody's getting any younger. And that includes the whole United States. We're fast becoming a nation of older men and women.

By 1975 our population will have reached the 190 million mark. Almost a third will be over 45, perhaps 21 million will be 65 or older. Better medical care keeps people alive longer. And geriatrics is making new strides every day.

But industrial employment is set up to cater to the younger worker. All businesses will be increasingly faced with the necessity of hiring older workers, a thing they have traditionally avoided.

Myths—Some of industry's long-standing preference for younger workers doesn't make sense. It is true that youth is valuable for high speed machine operation and assembly work, and of course for jobs requiring considerable physical strength.

But on other jobs the older worker is actually preferable. He is more stable, with better judgment. He is frequently more highly skilled. Jet engine makers, for example, are turning more and more to the higher age groups for qualified metal spinners. And years of experience are needed to make a first rate tool and die maker.

Absenteeism — Older workers spend more time on the job. Bureau of Labor Statistics figures give the highest absenteeism rate to workers under 20. This rate declines steadily for all reasons, including illness, until 65. Thereafter it rises very slightly.

Absenteeism by Age Groups

Age Group	Absenteeism Rates (per 100 workdays) All Reasons	Illness
All age groups	3.4	1.2
Under 20 years	5.5	1.6
20-24 years	4.9	1.3
25-29 years	4.3	1.1
30-34 years	3.6	1.0
35-39 years	3.4	1.0
40-44 years	3.5	1.2
45-49 years	3.4	1.2
50-54 years	3.3	1.3
55-59 years	2.8	1.1
60-64 years	2.9	1.2
65-69 years	3.3	1.1
70-74 years	3.2	1.5

Pct of Population 45 Years and Over in the Labor Force, by Age and Sex, 1890-1950

AGE & SEX	1890	1900	1920	1930	1940	1950
MEN						
45 and over	86.7	84.3	83.2	82.5	77.7	75.2
45–54	93.9	92.8	93.5	93.8	92.7	91.7
55–64	89.0	86.1	86.3	86.5	84.6	82.9
65 and over	68.2	63.2	55.6	54.0	42.2	41.6
WOMEN						
45 and over	11.1	12.3	14.3	15.4	16.3	22.2
45–54	12.5	14.2	17.9	19.7	22.4	33.0
55–64	11.5	12.6	14.3	15.3	16.6	22.8
65 and over	7.6	8.3	7.3	7.3	6.0	7.6

Figures for periods prior to 1940 adjusted to include persons of unknown age. Data refer to April, except 1890-1900 (June) and 1920 (January).

Safety—The older worker is a safer worker, on the average, than the below-40 group. Variations occur between the various age groups, but the older worker is below the average for all workers:

Work Injuries by Age Groups

Age Group	Disabling Injuries: Frequency Rate (per million hrs. worked)	Disabling Injuries: Average Days of Disability	Nondisabling Injuries: Frequency Rate
Under 20 years	19.8	4.0	1,230
All age groups	9.7	14.7	900
Under 20 years	19.8	4.0	1,230
20-24 years	4.0	23.4	1,500
25-29 years	9.2	13.3	1,560
30-34 years	9.0	6.5	1,420
35-39 years	11.4	1.6	1.9
40-44 years	12.4	16.5	1,050
45-49 years	1.3	1.3	1.4
50-54 years	1.0	1.0	1.3
55-59 years	10.1	19.1	630
60-64 years	9.5	16.2	560
65-69 years	9.1	12.4	430
70-74 years	4.9	15.0	320

Health — Many employers believe older workers are especially prone to illness. Although the group's low absenteeism rate is a strong argument against the idea, there is a fear of on-the-job sickness. But BLS figures on visits to plant medical facilities don't bear this out:

Age Group	No. of Medical Visits per Worker: All Workers	Men	Women
All age groups	1.3	1.2	1.8
Under 20 years	1.8	1.2	1.8
20-24 years	1.7	1.4	2.4
25-29 years	1.7	1.7	1.6
30-34 years	1.8	1.7	2.5
35-39 years	11.4	9.0	1,240
40-44 years	1.4	1.4	1.6
45-49 years	1.3	1.3	1.4
55-59 years	10.1	19.1	630
60-64 years	.9	.9	...
65-69 years	.6	.6	...
70-74 years	.8	.8	...

Pensions — Some companies claim that pension costs preclude hiring the post-40 worker. But most pension agreements are based on length of service, or otherwise disqualify the short-term employee. And older workers last longer than many people think:

Workers' Life Expectancy at 60 (males only)

Year	Aver. No. of Years of Life Remaining: Total	In Labor Force	In Retirement
1900	14.3	11.5	2.8
1940	15.1	9.2	5.9
1947	15.3	9.7	5.6

PRICING: New Pattern Emerges

OPS action on manufacturers using steel, copper, aluminum seen as shape of things to come . . . Automatic cost pass-ons ease Capehart cutoff date provisions—By *R. M. Stroupe.*

Pattern for future government action on pass-through of materials costs may be seen in the Office of Price Stabilization action involving manufacturers using steel, copper, and aluminum in their products.

Constant pressure from "outside" has been put on the entire industrial materials and manufactured goods division at OPS for relief from mounting labor and materials costs and higher freight charges. For example, manufacturers of automotive original equipment parts said last week they need to reflect in their prices 100 pct of added costs, plus normal markup.

Pricing Chief Ellis Arnall is on record as saying the same standards applied in granting steel producers a basic increase of $5.20 per ton must be used when other industries ask price relief. According to Arnall, "you can't have a price stabilization program based upon giving special treatment" to a single industrial group.

Extends Capehart Provisions—General effect of the pass-through ruling applying to steel, copper, and aluminum is a decrease of the burden on manufacturers who were hurt by the cutoff date in provisions of the Capehart Amendment. As the regulation took shape, the conviction grew that it would include provisions for reflecting labor and transportation cost increases, as well as higher materials costs, recorded up to the present date.

Price-setters working on the order were not immediately in agreement on the question of making price adjustments automatic with the manufacturer. Excellent grounds for this disagreement exist in the depleted staff at OPS, which says it is not equipped to perform the paper work involved in a detailed industry-wide price change.

Steel Precedent—Some officials demurred at this idea, apparently in the belief that all semblance of a federal controls system would disappear if industry determined its own ceiling adjustments. However, the voluntary system by which steel producers, to name one example, operated under the controls program for many months furnished OPS with a precedent for placing much administrative authority in industry hands.

Upshot of the trend established in the cost pass-through field is almost certain to be an improvement of the manufacturer's position. As the pass-through is permitted on additional commodities, and amendments are made in the basic order, more and more manufacturers should benefit from the more lenient controls plan.

Fabricators' Wage Hikes Okayed

Steel fabricating plant employees whose wage patterns traditionally follow changes in pay approved for workers in basic steel companies can get a 16¢ hourly increase through Wage Stabilization Board regional offices.

Primary requirement to be met by petitioners is establishment of proof that there has been a long-time "tandem" relationship between wages of employees in steel fabricating and production companies. If the more than 500,000 CIO and other fabricating industry employees can be shown to have risen each time basic steel workers have been given an increase, the requirement can be met.

In a mid-August action, WSB authorized its regional boards to handle within their own territories cases connected with the industry-union wage settlement last month. Companies and unions agreeing on wage terms have been instructed to file for approval through local wage and hour offices, noting plainly on the petition that it is a request for treatment as a tandem measure.

Unless WSB takes dissenting action within 30 days the company may raise wages.

Limited Conversion Use

National Production Authority this week put its okay on limited use of conversion steel by manufacturers (Dir. 19, CMP Reg. 1 for general steel users; Dir. 7, CMP Reg. 6 for the construction industry). The automobile industry now is in a position to produce its full third quarter quota of 1,050,000 cars. Conversion steel bought under the provisions of Dir. 19 is not affected by the 30-day inventory restriction.

All Clear on Tinplate Controls

Tinplate distribution orders will be removed as soon as possible. This assurance is given the tinplate industry by National Production Authority, which says the industry and food canners are now "out of the woods" on the perishable-pack problem.

Tin situation generally is now viewed with official optimism. NPA tells the industry that:

(1) Tin outlook is "better than it has been for a long time."

(2) Foreign purchases by the U. S. are being delivered on or ahead of schedule.

(3) Reopening of the foreign market to private buyers is expected to have a further stimulating effect upon supplies generally.

But export quotas may be resumed on short notice.

No Price Curbs on $25,000 Gross

Manufacturers with gross sales amounting to not more than $25,000 annually no longer are bound by price control restrictions.

Many firms producing such items as hand and garden tools, cutlery, wooden-ware, can openers,

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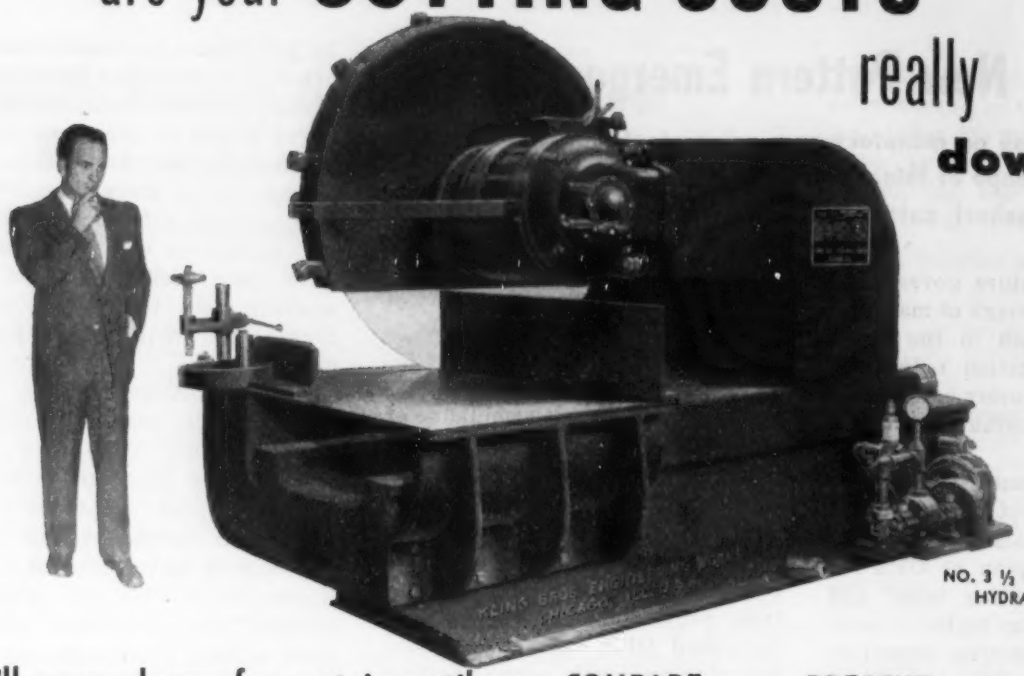
are your CUTTING COSTS really down far enough ?



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Learn how you can profitably apply Kling Friction Sawing in your plant. The information contained in this 12-page bulletin will give you the complete story on Friction Sawing . . . including the principles of the process and some of its applications. Write today for your FREE copy.

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24" 100 lb. I Beam	⊢	28 seconds
15" 55 lb. Channel	⊓	15 seconds
8"x8"x34.3 lb. H Beam	H	10 seconds
100 lb. A.R.A. Rail	I	9 seconds
6-1/2"x6-1/2"x19.8 lb. Tee	T	5 seconds
8"x8"x3/4" Angle	∧	11 seconds
3" Square	■	10 seconds
4" Round	●	15 seconds
6" O.D. Tube, 1/2" Wall	○	11 seconds

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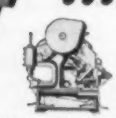
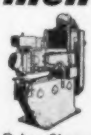

Combination Shear Punch & Copers

Double Angle Shears


Rotary Shears

Punches

Plate Bending Rolls

cabinet work, and sports equipment are covered by the exemption, effective from Aug. 20. Details of the exemption are set forth in Amend. 33, General Ceiling Price Reg. and Amend. 54, Ceiling Price Reg. 22.

Specifically, the exemption applies to a manufacturer with gross sales of $25,000 or less from all his production units in his last complete fiscal year prior to July 1. There is an identical exemption for the new manufacturer who does not expect to sell more than $25,000 worth of products in his first fiscal year ending after July 1.

Industry Controls This Week

Aluminum—SR 113, GCPR authorizes a price increase for producers of aluminum mill products. Amend. 11, CPR 67 places resellers of primary aluminum mill products under regulations of CPR 67.

Copper Castings—Amend. 7, CPR 60 permits an increase in prices of copper and copper alloy castings.

Experimental Metals—Amend. 25, GOR 9 exempts limited sales by producers of experimental metals and alloys from price controls.

Machinery—Amend. 3, SR 4, CPR 30 outlines a method for machinery manufacturers to propose alternate pricing methods.

Manufacturers' Prices—Amend. 33, GCPR and Amend. 54, CPR 22 exempts manufacturers with gross sales amounting to not more than $25,000 annually from price controls.

Polyethylene—Revoc., Sched. 3, M-45 removes allocation controls on polyethylene.

Nickel—Dir. 1, M-20 is designed to conserve nickel and other alloying units.

Ships—Amend. 24, GOR 9 suspends price controls from sales or deliveries of new ships not more than 65 ft in length.

Steel—Dir. 2, M-50 prohibits electric utilities from accepting steel in controlled material form under certain conditions.

Stoves—Amend. 1, SR 30, CPR 22 provides that prices for gas and electric cooking stoves be quoted and billed on a delivered basis.

Tin—Amend. M-34 removes end use controls from mill accumulation plate, unassorted temper tinplate, unmended menders and other coated secondaries. Amend. 1, M-25 exempts tin cans made of secondaries from can material specifications and quotas.

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Lead assys, 104444 ea, $1,423,016, Elastic Stop Nut Corp. of America, Elizabeth, N. J.

Spare parts, $68,432, Stewart Warner Corp., Indianapolis, *A. N. Phillips.*

Components of Type E-12 Automatic Pilot, $4,476,795, Minneapolis-Honeywell Regulator Co., Minneapolis, *S. F. Keating.*

Spare parts for projectors, $28,820, Bell & Howell Co., Chicago.

Spare parts, lot, $51,315, Wisconsin Motors Corp., Milwaukee.

Indicator, Airspeed, 937 ea, $188,649, Kollsman Instrument Corp., Elmhurst, N. Y.

Generator set, 200 ea, $698,146, ACF Brill Motors Co., Philadelphia.

Remote tuning assy, 579 ea, $126,960, Central Commercial Inds., Inc., Chicago.

Tank assy, 6592 ea, $5,553,403, Fletcher Aviation Corp., Pasadena, Calif.

Inverters, 270 ea, $138,906, Jack & Heintz, Inc., Cleveland, *P. J. Barensfeld.*

Cameras, 610 ea, $1,445,000, Hycoon Mfg. Co., Pasadena, Calif., *A. L. Melzian.*

Tachometer indicators, $431,669, General Electric Co., Schenectady, *W. H. Bobear.*

Spare parts for 90 MM gun mounts, 9 sets, $643,533, Miller Printing Machinery Co., Pittsburgh.

Repair parts for pumps, 147, $26,173, Smith-Meeker Engr. Co., New York.

Repair parts for pumps, 788, $35,183, Vickers, Inc., Waterbury, Conn.

Repair parts for gasoline engines, 226,995, $1,439,994, Packard Motor Car Co., Detroit, *R. R. Rees.*

Repair parts for air compressors, 960, $27,353, Hardie Tynes Mfg. Co., Birmingham.

Repair parts for turbines, 1749, $65,560, General Electric Co., Philadelphia.

Nozzle-Aircraft Fuel Servicing, 274 ea, $83,687, Parker Appliance Co., Cleveland.

Shears, 188 ea, $31,349, Peck, Stow & Wilcox Co., Southington, Conn.

Special tools, $213,880, Sperry Gyroscope Co., Great Neck, L. I., N. Y., *George A. Dennis.*

Misc. spare parts, $49,987, Link Aviation, Inc., Binghamton, N. Y.

Trainer-Demonstrator, 74 ea, $71,478, Universal Scientific Co., Inc., Vincennes, Ind.

Spare parts, 422 ea, $1,478,333, Continental Motors Corp., Muskegon, Mich.

Jettisonable aluminum fuel tanks, 6,010,063, Boeing Airplane Co., Seattle.

Indicator, $268,435, Riverside Metal Co., Riverside, N. J.

Wheel assy, nose, 2433 ea, $144,392, General Tire & Rubber Co., Akron.

Wheel assy, main, 1850 ea, $471,246, Goodyear Tire & Rubber Co., Akron.

Wheels, 2544 ea, $3,351,560, Bendix Aviation Corp., South Bend, Ind., *G. I. Lyman.*

Alternator drives, 615 ea, $1,291,996, Sunstrand Machine Tool Co., Rockford, Ill.

Indicator, manifold pressure, 220 ea, $33,917, Bendix Aviation Corp., Teterboro, N. J.

Spare carburetors & spare parts, $171,592, Bendix Aviation Corp., South Bend, Ind., *G. I. Lyman.*

Spare parts for Z-1A & Z-1B trainers, lot, $125,122, Curtiss-Wright Corp., Carlstadt, N. J.

Spare part for P-2 trainers, lot, $346,358, Curtiss-Wright Corp., Carlstadt, N. J.

Portable air compressors, 60 ea, $69,840, Worthington Corp., Cincinnati.

Indicators, 9120 ea, $5,970,876, Bendix Aviation Corp., Teterboro, N. J.

Indicator oil pressure, 3039 ea, $170,545, Kollsman Instrument Corp., Elmhurst, N. Y.

Indicator fuel pressure, 1975 ea, $94,457, Bendix Aviation Corp., Teterboro, N. J.

Portable arc welder, 52 ea, $28,080, General Electric Co., Schenectady.

STEEL: Output Shows Effects of Strike

As Reported to the American Iron & Steel Institute

	Openhearth		Bessemer		Electric		Total		Calculated	No. Weeks in
1951	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Net Tons Weekly	Month
January	7,846,657	101.4	431,725	90 4	570,084	88 6	8,848,466	99 9	1,997,396	4.43
February	6,936,993	99.3	326,112	75 6	507,302	87.5	7,770,407	97 2	1,942,602	4.00
March	8,061,346	104.2	408,926	85 6	606,358	94.5	9,076,630	102 5	2,048,901	4.43
1st Quarter	22,844,996	101.7	1,166,763	84 2	1,683,744	90.4	25,695,503	100 0	1,998,095	12.86
April	7,858,839	104.9	392,472	84 9	594,668	95.7	8,845,979	103 1	2,062,000	4.29
May	8,072,994	104.4	408,650	85 6	618,511	96.4	9,100,155	102 8	2,054,211	4.43
June	7,669,449	102.4	403,001	87 1	589,898	94.9	8,662,348	101.0	2,019,195	4.29
2nd Quarter	23,601,282	103.9	1,204,123	85 9	1,803,077	95.7	26,608,482	102 3	2,045,233	13.01
1st 6 months	46,446,278	102.8	2,370,886	85 0	3,486,821	93.0	52,303,985	101.1	2,021,801	25.87
July	7,706,078	99.8	411,599	88 4	566,818	88.5	8,684,495	98.3	1,964,818	4.42
August	7,694,965	99.5	436,822	91 5	607,308	94 6	8,739,095	98 7	1,972,708	4.43
September	7,653,801	102.4	404,726	87.7	601,830	97.0	8,660,357	101.2	2,023,448	4.28
3rd Quarter	23,054,844	100 5	1,253,147	88 5	1,775,956	93.4	26,083,947	99 4	1,986,592	13.13
9 months	69,501,122	102 0	3,624,033	86 2	5,262,777	93.1	78,387,932	100 5	2,009,947	39.00
October	8,028,721	103.8	458,128	95 9	635,037	98 9	9,121,886	103 0	2,059,116	4.43
November	7,750,845	103.5	411,954	89 1	636,553	102.4	8,799,352	102.6	2,051,131	4.29
December	7,885,830	102.2	396,831	83 3	606,017	94 9	8,890,678	100 6	2,011,466	4.42
4th Quarter	23,665,396	103.1	1,266,913	89 4	1,879,607	98.7	26,811,916	102.1	2,040,481	13.14
2nd 6 months	46,720,240	101.8	2,520,060	89 0	3,655,563	96.0	52,895,883	100 7	2,013,548	26.27
Total	93,166,518	102.3	4,890,946	87.0	7,142,384	94.5	105,199,848	100.9	2,017,642	52.14
1952										
January	8,103,123	100.7	407,298	89 3	625,696	89.7	9,136,117	99.3	2,062,329	4.43
February	7,703,066	102.4	382,712	89 8	571,432	87.6	8,657,210	100 7	2,091,114	4.14
March	8,401,140	104.4	378,861	83 1	624,190	89 5	9,404,191	102 2	2,122,842	4.43
1st Quarter	24,207,329	102.5	1,168,871	87 4	1,821,318	89 0	27,197,518	100.7	2,092,117	13.00
April	7,101,199	91.1	323,006	73.2	566,937	83.9	7,991,142	89.7	1,862,737	4.29
May[1]	7,291,865	90.6	318,642	69.9	594,089	85.2	8,204,596	89.2	1,852,053	4.43
June[2]	(a)	.....	(a)	.....	(a)	.....	1,639,000	18 4	382,000	4.29
2nd Quarter[2]	.....	.....	.....	.....	.....	.....	17,834,738	66 0	1,370,848	13.01
1st 6 months[2]	.....	.....	.....	.....	.....	.....	45,032,256	83 4	1,731,344	26.01
July[2]	.....	.....	.....	.....	.....	.....	1,605,000	17.5	363,000	4.42

Note—Percentages of capacity operated in 1951 are calculated on weekly capacities of 1,745,337 net tons openhearth 107,906 net tons bessemer and 144,891 net tons electric ingots and steel for castings total 1,999,034 net tons; based on annual capacities as of Jan. 1, 1951 as follows: Openhearth 91,034,020 net tons, bessemer 5,621,000 net tons, electric 7,554,630 net tons, total 104,229,650 net tons. Percentages for 1952 are calculated on weekly capacities of 1,816,637 net tons openhearth, 102,926 net tons bessemer and 157,477 net tons electric ingots and steel for castings, total 2,077,040 net tons; based on annual capacities as of Jan. 1, 1952 as follows: Openhearth 94,973,780 net tons, bessemer 5,391,000 net tons, electric 8,232,890 net tons, total 108,587,670 net tons.

[1] Revised. [2] Preliminary figures, subject to revision. (a) Not available.

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Industrial Briefs

Distributor Appointed—Machine tool import firm of ERIC R. BACHMAN has been appointed exclusive U. S. distributor for the complete line of machine tools manufactured by Ludwig Loewe & Co., A. G., Berlin.

Value—Dollar value of iron ore imported through the Mobile customs district during the first five months of 1952 for North Alabama steel mills amounted to $2,365,915.

Low Output—AMERICAN IRON AND STEEL INSTITUTE reports production of steel in the first 7 months of 1952 fell to 46,637,256 net tons because of the strike.

Agreement Approved—Board of directors of LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Ia., has approved an agreement and plan of reorganization with ALLIS-CHALMERS MFG. CO., Milwaukee.

Purchase Made—HAGAN CORP. has purchased American Cast Products, Inc., Orrville, Ohio.

Centennial—During the Centennial of Engineering, ARMOUR RESEARCH FOUNDATION of Illinois Institute of Technology will sponsor a Centennial Conference on Industrial Research, Sept. 9. Meeting will be held on the Illinois Tech Campus.

New Location—TELEFLEX INC. will move their main office to 125 S. Main St., North Wales, Pa., later this month.

Appointed Agent—Donie Engineering Sales, Inc., Indianapolis, has been appointed manufacturers' agent for A. O. SMITH CORP. in Indiana.

Scrap Seminar — INSTITUTE OF SCRAP IRON & STEEL INC. will open a Second Scrap Seminar at Carnegie Institute of Technology, Pittsburgh, on Sunday, Aug. 24,

Production—About 4 years will be needed to build a plant for production of Uranium-235 in Pike County, Ohio, but portions of the facility will begin operations as completed. PETER KIEWIT SONS' CO., Omaha, Neb., will be principal construction contractor.

Warehouse Established — QUAKER RUBBER CORP., Portland, Ore., has established a new branch warehouse and sales office to serve the Pacific Northwest.

New Building — UNITED STATES DRILL HEAD CO., Cincinnati, purchased an additional building, part of which will be used by the newly-expanded engineering department.

New Plant — M. E. CUNNINGHAM CO. has acquired a new plant in Pittsburgh. Increased floor space will permit a more efficient production arrangement.

Contract Awarded—Contracting Div., DRAVO CORP., Pittsburgh, has been awarded a contract for construction of new harbor facilities at the Weirton, W. Va., Plant of Weirton Steel Co.

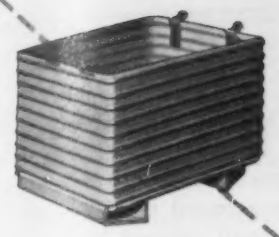
Preview—More than 1300 people, including employees and residents in the neighborhood of its plant, attended a preview of a new color film of HEPPENSTALL CO., Pittsburgh. The film, *Something More Than Steel*, showed the making of die blocks and shear knives, representative of the company's varied activities.

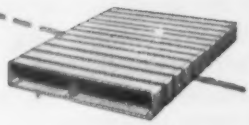
New Quarters — Next month MACHINERY ASSOCIATES, INC., will move to new and larger quarters at 325 E. Lancaster Ave., Wynnewood, Pa.

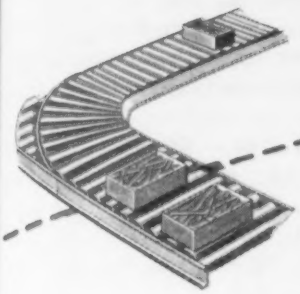
Moved — CARBOMATIC CORP. has moved its manufacturing plant and offices from Long Island City to 70 Bennington Ave., Freeport, N. Y.

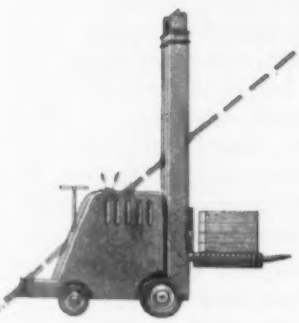
Opened—THE NATIONAL SUPPLY CO. has opened a supply store at Glendive, Mont., to serve the needs of drilling contractors and producers.

Handle materials better, more cheaply, with equipment made of









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Magnesium Acceptance Growing

Big jump in use won't come overnight, but development work promises bright future . . . Cost, manufacturing difficulties main obstacles . . . Chrysler biggest user—By *R. D. Raddant.*

It isn't happening overnight, but magnesium is working its way into a permanent and expanding position in the auto industry.

Use of this extremely light weight metal actually won't be extended much during the coming year. At the same time, research and development work assures its vastly increased use in the future.

At the moment, cost and manufacturing difficulties have held up its use for some parts where it has advantages. Second, it is strictly competitive with aluminum. Compared with aluminum, its advantages are the type that can only be fully exploited in much greater production.

Some of the difficulties are shown in Chrysler's attempt this year to use large magnesium die cast clutch and torque converter housings. The largest magnesium die casting in the world, it weighed in at 7 lb less than aluminum and nearly 50 lb less than cast iron housings.

Troubles — But manufacturing problems developed with the vendor. These were licked in a short time. Then impregnation proved to be unsatisfactory.

Conventional magnesium impregnation proved unsuitable and too expensive. By the time this was solved, by the use of plastics, production men were discouraged and the housings were being made with aluminum.

Chrysler, however, is the foremost user of magnesium and has 16 castings ready to use. Many of these will replace zinc.

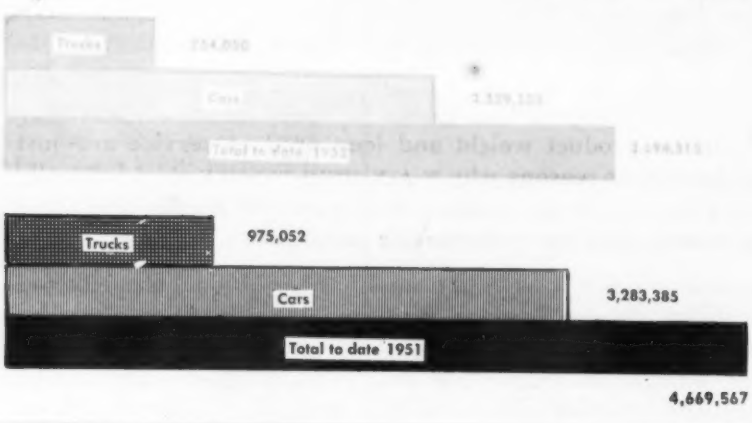
Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS	TOTAL
Aug. 9, 1952	35,038	7,926	43,064
Aug. 18, 1951	99,893	29,768	129,661
Aug. 11, 1951	75,226	22,126	97,352

*Estimated

Source: *Ward's Reports*



Aluminum Competition—In the bitter competition between aluminum and magnesium, aluminum has some distinct advantages. Magnesium cannot be used where it is exposed to severe corrosion. This will prevent its use for cylinder blocks for which aluminum is already making a bid. Magnesium can stand less wear and can take less stress.

Its advantages over aluminum, in addition to its lighter weight, lie in its properties for die casting. Full extent of these advantages can only be developed in extensive mass production.

Magnesium has no affinity for steel and its dies last longer. In magnesium die casting, dies can be immersed for hot chamber casting. Its lower density gives it a lower capacity for heat resulting in much faster casting speed.

And Zinc — Some sources predict that magnesium will completely replace painted zinc castings in future automobiles. Replacing zinc will be its major field of extension.

Although zinc is cheaper than magnesium, magnesium has a 4 to 1 weight advantage. In other words, zinc would have to drop to 10¢ per lb to stave off magnesium inroads costwise. At the same time, magnesium costs will drop considerably as methods improve in production. Plated magnesium ornaments are also in the wind.

Chrysler emphasizes that magnesium and other light metals are not used to save weight, but to save money. However, weight is becoming a problem in many cars and it follows that if pounds can be saved here, it enables the producer to add other features. At present, quotations for magnesium castings are about the same or slightly lower than for aluminum. Wider use is expected to bring them lower.

Air Conditioning — Last month General Motors rushed through a hasty announcement that air con-

ditioning units would be available as optional equipment in some 1953 models. Some insiders said that the announcement came with such speed that it actually caught some of the divisions involved by complete surprise.

Reason for the rush became apparent this week when Chrysler followed through with its own air conditioning system developed in conjunction with its Airtemp Div., a manufacturer of air conditioning and heating systems.

Chrysler's unit has the advantage of using fresh air from outside the car in its air conditioning instead of using recirculated air. The high capacity system developed by Chrysler has the cooling equivalent of melting nearly 3 tons of ice per day.

Chrysler did not disclose production plans or probable availability of the cooling units. Presumably they will be ready for 1953 models as optional equipment.

Auto Steel Quota Battle Resumes

Battle of the quotas is underway again in Washington after nearly 2 months enforced silence because of the steel strike. (See p. 79).

With steel shortages expected to be largely overcome by the time the 1953 production season starts, industry spokesmen are asking for quotas that will permit the production of 3 million cars during the first 6 months of the year.

Arguing point is that while NPA authorized building 4.5 million cars during 1952, the steel strike and resulting shortages will cut production to 4 million cars. This results in what the industry likes to call "a 400,000 deficit."

Behind this reasoning is the conclusion that steel strike effects will be largely overcome within 6 months. This conclusion is not unanimous with everybody and probably not shared by NPA. It is significant, however, that automotive buyers have not booked conversion beyond 3 months, although conversion mills are booked completely for ingots for a full quarter.

HEALTH:

GM trains medical students on the job in industrial medicine.

On-the-job training is now being extended to medical students in General Motors' expanding program of industrial medicine.

This summer, four medical students from the University of Michigan are spending their vacations working in GM plants with plant medical directors. In these plants, they will become thoroughly acquainted with the practical problems of occupational health before they return to their senior year studies at medical school.

This practical training is part of GM's broad program of improving the standards of industrial medicine. Throughout industry in general, employment health programs have lagged somewhat behind other phases. GM and other industries now realize the importance of prevention, diagnosis and treatment of industrial disease.

Further Study—Under Dr. Max Burnell, GM medical director, the company has pioneered in industrial health at the University of Michigan. At the end of medical school, young doctors who intend to specialize in industrial medicine can enroll with GM for a further year's work at industrial health departments and in the School of Public Health.

In the "on-the-job" summer program, carefully selected students are given jobs in GM plants where they come face to face with actual conditions and work with plant medical directors in their day-to-day problems.

Result is that the program is going a long way to stimulate interest among medical students in industrial medicine and to attract the highest type of young doctors into this formerly somewhat neglected but vitally important field.

THE BULL OF THE WOODS By J. R. Williams

JUST A MINUTE, NAPPER-- HE MAY WANT YOU TO GO UP TO THE DRAFTIN' OFFICE WITH HIM!
IT WOULD BE A GOOD GAG TO TAKE HIM UP AN' GIVE THEM BRIGHT BOYS A LOOK AT TH' BIRD WHO SUGGESTED SUCH A GOOD IDEA!
HIS IDEA IS SOUND--YOUR GAG ISN'T! THEY'LL SAY, "WELL, THERE'S ONE GOOD MAN DOWN THERE!"
YEH, I'VE ALLUS SAID EDUCATION GRASPS IDEAS--BUT INTELLIGENCE GITS 'EM!
GEN. DRAWING COURSE
8-22
J.R.WILLIAMS
THE OLD HEAD
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DPA Wrestles With Car Output Problem

How much steel for autos in first quarter '53? . . . Labor backs industry in quota demand . . . DPA must decide on permitting above-quota conversion steel for Detroit—By G. H. Baker.

Defense Production Administration's hot potato this week: How much steel should be allotted for production of passenger automobiles in first quarter 1953? (See p. 77.

The industry, backed by labor, wants the government's OK on a first quarter production schedule that calls for minimum output of 1,250,000 units. Industry spokesmen are asking quotas to make 3 million cars for the first 6 months of 1953.

The government, willing enough to agree to the 1,250,000 figure but wary of the possible effect upon the military armament and civilian industries schedules, would prefer the rate to be less.

Conversion Steel — Decision which DPA must inevitably bring itself to make is this: Should the industry be allowed to use above quota conversion steel and imported steel? Feeling at DPA is that the automobile industry is ingenious enough to obtain the materials necessary to produce all the cars the market will absorb in 1953 if there are no restrictions on the use of materials.

At press time this week it appeared likely National Production Authority would issue an order taking conversion steel out of the CMP orbit.

Goals at Stake—Current allotments of steel for the fourth quarter will be sufficient to permit the industry to make 70 to 75 pct of permissible production. The industry says that if it is allowed conversion and import steel outside of its CMP allotments, it can not only meet the 1952 goal, but also its projected 1953 goals.

Defense Transport Administration recommends 1,250,000 passenger cars and 300,000 trucks for the first quarter. The industry already is assured of enough copper and aluminum to meet the DTA goals. And DPA says it has no present intention of reducing these copper and aluminum rations, whether the industry is able to consume the materials at this rate or not.

Military Buying—The rules under which the Defense Dept. soon will conduct its unified purchasing operations are undergoing final revision and polishing at the Pentagon this week as officials rush to beat the Sept. 8 deadline imposed by the new military procurement law.

The separate shopping lists previously drawn up each year by the Army, Navy and Air Force have been resulting in the wasting of as much as $5 billion annually, it is estimated by congressmen investigating the military's buying habits. Unified purchasing was written into law by Congress after 6 years of foot-dragging on the part of the armed services.

"Well, yes . . . I am up to my ears in work."

Single Catalog — Acting under the new law, Defense Dept. has created a Defense Supply Management Agency. Its primary task is to publish a single supply catalog, and to require all three branches of the armed services to use it. It must also see to it that one branch of the services does the buying for the other two. Army, for example, is to buy all shoes for the Air Force and Navy.

The new agency is to make its first official report to Congress in January. Congress intends to see to it that the report does not minimize the advantages of centralized procurement. (Prior to passage of the law, the Pentagon insisted centralized buying wasn't always practicable.)

Dead by Default—Shelving of plans to build an integrated steel mill near New London, Conn., fails to draw even mild protests from New England congressmen. For the time being, at least, the project is a dead duck.

Defense Production Administration's refusal to extend further a fast writeoff certificate granted the New England Development Corp. is based on apparent inability to attract sufficient capital.

Altogether, four extensions of the original certificate of necessity (issued in January, 1951) were granted by DPA. Both the third and fourth extensions were described as "final." Amortization experts at DPA have now made it clear that there's no point in talking about a new certificate unless the sponsors can show definite evidence of starting construction.

The late Senator Brien McMahon, D., Conn., was largely instrumental in promoting the project within government agencies. As an aide of his puts it: "He kept the spark alive. When he died, I'm afraid it went with him."

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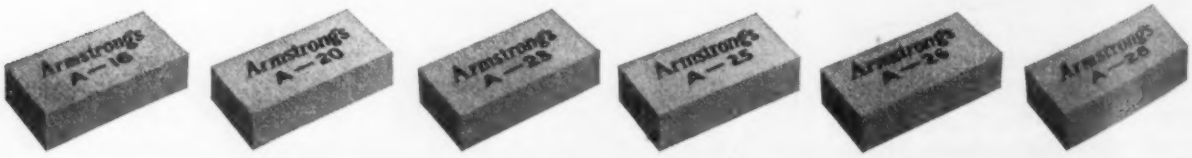

ARMSTRONG'S INSULATING REFRACTORIES

CONTROLS: NPA Wants Them Kept

Plan to retain curbs on copper, aluminum, tin and other materials in improved supply . . . No quota cuts planned . . . Real demand more than CMP needs—By *A. K. Rannells.*

Removal of such materials as copper, aluminum, and tin from under the Controlled Materials Plan and regulation seems to be far in the future, despite increasing availability and the fact that for practical purposes the supply is virtually in balance with demand.

However, officials say no reduction in current copper and aluminum allotment levels is being considered, regardless of how little steel may be available over the immediate future.

There are two primary reasons why National Production Authority believes it is necessary to retain allocation authority over these metals.

Still Unbalanced—One is that top officials do not believe that a "real balance" has arrived. NPA Chief Joe Fowler says that supplies are apparently in balance with demand but only with respect to requirements as controlled by CMP allocations.

He is not convinced that were controls discarded and the availability of supplies thrown open to all comers that the "real" demand would not exceed foreseeable supplies over the next few months and throw supply and demand out of balance again.

Stockpile — Status of the national stockpile is the second big reason. During the scarcity, a sizable amount of copper was withdrawn. In the national security interest, this must be replaced and the present level increased.

Approximately 25,000 tons of copper can be returned or set aside for the stockpile quarterly under the present allocation rates, Defense Production Administration says. This should repay withdrawals before the end of first half 1953 and permit additions to the emergency store.

Curbs Eased—Meanwhile, a series of moves by NPA were designed to make it easier to obtain such controlled materials within controlled quantity limits.

In four related actions—revocation of M-74, and amendment of CMP Reg. 6, of M-100, and of M-77—the quantities of copper and aluminum which may be self-authorized have been increased and most restrictions on use for construction have been removed.

New self-certification limits for copper and aluminum for construction are:

Industrial plants—5000 lb of copper and 4000 lb of aluminum per project per quarter; highways —500 lb each of copper and aluminum per project per quarter; and other construction—2000 lb of aluminum and 1000 lb of copper.

With amendment of Dir. 3 to CMP Reg. 1, smaller orders for steel, copper and aluminum need not be held below carload quantities, provided users do not order in excess of authorized allotments.

Automatic Quotas—Also, NPA has set up a procedure which provides automatic allotments (self-certification), provided requirements are held to third quarter levels. Thus, about 10,000 makers of B products are relieved of the necessity of filing CMP-4B allotment applications, beginning with first quarter 1953.

"All I know is what I read in The Iron Age."

This brings to 35,000 the estimated total of small users who will have self-certification privileges. This will cut down NPA paper work by an estimated 60 to 75 pct although the agency will still continue to allocate a majority of the actual tonnage.

Meanwhile, it has been decided that tentative levels for first quarter 1953 allotments of copper and aluminum will be 100 pct of third quarter allocations—up to 40,000 lb of copper and 60,000 lb of aluminum.

Bearings:

DPA sets expansion goal of $77 million . . . Lists other targets.

Defense expansion of production facilities in the anti-friction bearing industry has been calculated by Defense Production Administration at $77 million in capital investment since the mobilization program began.

Meanwhile, the friction bearings industry's interim expansion goal has been set at $10 million, covering expansion since July 1, 1951, and to be completed by July 1, 1953

Other Goals—Other metalworking expansion goals in the interest of defense production have been determined as follows:

Pumping machinery, an additional $35 million worth of facilities above 1950 capacity, to be completed by July 1, 1954.

Metal tanks, capacity to consume an additional 250,000 tons of steel over 1951, for a new total consumption capacity of 1.5 million tons, to be completed by July 1, 1953.

Tubular heat exchangers, an expansion of 20 million sq ft production over 1951 capacity, for a total of 58.5 million sq ft of surface, to be completed by Jan. 1, 1954.

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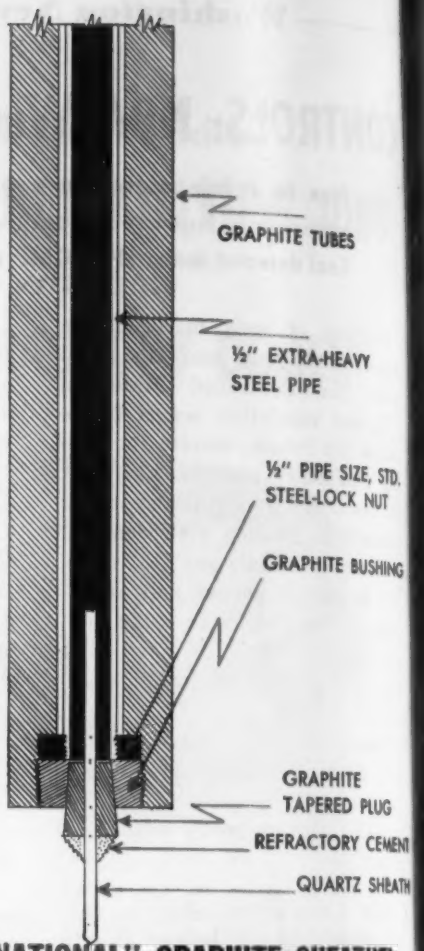

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Earthquake Track Damage Repaired

Southern Pacific spends $2 million repairing Tehachapi Mt. trackage . . . Men, equipment brought in from all over West . . . Most rails salvaged . . . Pipe is tightest—*By T. M. Rohan.*

Southern Pacific R.R. after moving 1.25 million cu yds of dirt and suffering $2 million damage and expenses finally restored service last week on the earthquake ridden Tehachapi Mountain trackage 28 mi southeast of Bakersfield, Calif. This line is a vital freight link between Los Angeles and northern California and is also leased to Santa Fe. Passenger traffic generally takes the scenic coastal route.

In the July 21 earthquake four tunnels were damaged beyond use. The railroad decided to "daylight" three by shaving down the mountain to track level and bypass the fourth and longest with a 3200 ft "shoofly." It contracted with Morris-Knudsen Engineering and between the two put 1000 men and 50 bulldozers to work around the clock. Equipment was pulled in from as far as Albuquerque; cat skinners had to be flown in from as far as Idaho and Phoenix because of a local strike. Some lived in buses; others slept in fields and farmhouses.

Reclaimed Rails — Hard-to-get rails were snaked out of the largest ruined tunnel and re-used on the bypass so only about 500 ft of new rails from stock were necessary. A top priority brought 200 tons of 8 in. I beams from U. S. Steel (Consolidated Western) at Los Angeles. Some Belgian beams were also grabbed. Tightest item was 8 in. culvert pipe for which SP scrounged all up and down the coast. Enough was finally obtained from U. S. Steel at Los Angeles, Bureau of Reclamation at Shasta Dam, a Portland, Ore., railway yard, and a pipe company at Azusa, Calif.

Rail service was restored at week's end but harried farmers whose concrete irrigation pipe cracked like dry macaroni in the tremors were using anything that held water to save their crops. Vertical casing in oil wells was less seriously damaged, often suffering only a few dents.

Still unassessed was damage to buildings and foundations. The state at week's end was considering moving in a team of engineers and geologists to evaluate total damage and make recommendations.

The Straggler—Northwest Steel Rolling Mills at Seattle finally got back in production last week after settling its strike which outlasted the national one by 2 weeks. United Steel Workers Local 6 settled on the national pattern plus satisfaction of eight minor grievances, none of them monetary, which had prolonged the strike to 72 days. Among the settlement conditions is a study toward setting up incentive system for electric furnace crews.

One of the two electric furnaces was started up last week but the second needs rebuilding. The rolling mill also will require about 10 days' maintenance. Northwest is currently working on a 1200-ton order for the City Light Co. of Tacoma and 300 tons for the University of Washington hospital.

New Seidelhuber Plans — Bolstered by its Reconstruction Finance Corp. loan granted 2 weeks ago, Seidelhuber Steel at Seattle reshuffled its plans again and expects to begin producing ingots in a month. This will be the first steel production since completion of a British contract early this year. Seidelhuber also expects to order a second electric furnace in about a year when rolling capacity justifies it.

Some of this new steel and also tonnage from neighboring Isaacson Iron Works may go to foreign markets because of the necessity for charging higher prices than the domestic market will stand. With the present tight market following the steel strike, however, U. S. mills may be willing to stand the losses from cropping, trimming and freight.

GALLOPING GOOSE GONE: Colorado's historic and scenic Rio Grande Southern Ry. was out of business last week. In early days it hauled silver ore between Durango and Ridgeway, but in recent years declined to original-design engines like this one. Road never paid a dividend in 60 years operation. It has been sold to a Chicago salvage firm for $409,000. Claims against it were $6,279,000.

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Machine Tool High Spots

New Order Helps, But Not Enough

Revised M-41 allows machine tool builders to give some help to major civilian customers and export . . . But critical list items may cause some trouble—*By G. Elwers.*

Machine tool builders who do not have most of their products on the critical list are finding the revised M-41 a step in the right direction, though not all they had asked for.

It enables them to give some service to their major civilian customers, such as auto builders and appliance makers. And now they can attempt to stem the serious decay of their foreign markets.

How Much Trouble—So far, it is hard to tell how much trouble will be caused by the provision that non-rated civilian orders cannot be shipped unless rated orders are being shipped on time. This seemingly reasonable provision is actually unfair, since few rated orders bear specified delivery dates based on actual needs.

Builders of machines on the critical list which forms a part of the amended M-41 are not very happy. Machines on this list cannot be built for non-rated customers. It was argument over this list that held up issuance of the M-41 revision.

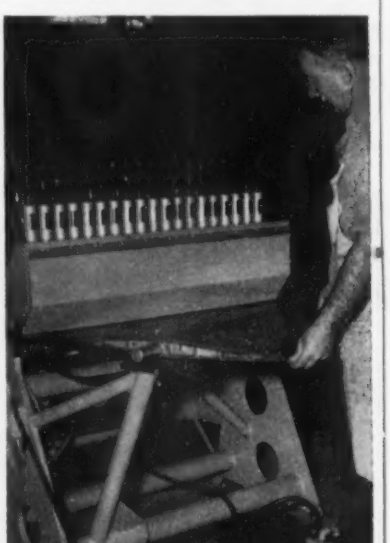
Not Needed—The machine tool industry fails to see the necessity of either the list or the ban on shipment of machines on the list.

Purpose of the list, of course, is to assure that nothing will interfere with delivery of the critical types of machines needed by defense contractors. But, machine tool builders point out, M-41 even without the critical list takes care of this. Builders who have not kept up with their defense deliveries are not able to ship a non-rated machine anyway, list or no list.

A Way Out—However, there are indications that Washington is going to be tolerant regarding Section 14 of M-41, the escape clause. Under this section, a builder may ship any non-rated machine, even one on the critical list, if he has permission from National Production Authority.

Section 14, which lists the conditions under which this permission may be applied for and granted, is broadly written. As a result much will depend on how it is interpreted by the NPA officials who will make the decisions.

Permission Granted — Permission to ship a non-rated critical list machine tool can be granted if a builder can show that M-41, in a particular case, works an undue hardship on him. Also, if he can show that non-shipment of a non-rated machine will be against the public interest, he can apply for permission.



ONE SHOT: At Douglas Aircraft's Santa Monica plant, one operation drills 19 holes in the leading edge of this missile fin. The operator turns the fin over and seven holes are drilled in the trailing edge. Time for complete job: 36 sec.

Public interest, says Section 14, involves requirements of the public health and safety, civilian defense, and dislocation of labor with subsequent unemployment.

There's a lot of latitude in the wording of Section 14. This gives hope to builders of critical list machines that they at least will be able to satisfy some of the urgent demands of their better civilian customers. Their chances of getting back into the foreign market, however, look very black.

Administration Faulted—There is great concern among many people close to the Air Force heavy press program over the way things are going. The trouble seems to be administration by men who know little about presses or forging and don't see the importance of pushing the program as much as possible.

There seems no doubt that top brass has been convinced of the urgent need for large forging presses and related equipment. Aircraft designers and builders agree. Reports are that it is in between, on the direct administrative level, that the snafu occurs.

Official View—Want a definition of machine tools? Here's one from a government news release: "All power driven metalworking machines not capable of being operated while being held in the hand, having one or more tool and work holding devices, and used for progressively removing metal in the form of chips, turnings, borings, etc."

And that's not all. "Honing machines, lapping machines and grinders are considered to be machine tools."

Book Steel Mills to Limit—Then Some

Mills will be fully booked for fourth quarter . . . Not much hope for quota hikes . . . U. S. strike turns the tide . . . Ore picture improves . . . Steel price increases—By *F. Sanderson.*

Canada's iron and steel industry is booming. Fourth quarter bookings are in full swing and the next 2 or 3 weeks will see all production for the closing 3 months of the year fully contracted. Steel mill officials again report that there will be a substantial carryover of unfilled tonnage from the third to fourth quarter and there are little prospects of consumer quotas being increased.

On all the heavier lines of steel, demand continues in excess of supply. Six months ago predictions were that supply and demand would come into balance in the last quarter of this year. But the American steel strike cutting off import deliveries to Canada has reversed these predictions. It now is apparent that shortages of such items as plate, bars, sheets, structurals will continue well into first quarter, 1953.

Safe on Ore? — Mills in the Hamilton district are breathing easier. They can see possibilities of obtaining their full quota of iron ore from the United States before Great Lakes navigation closes. Already iron ore deliveries have been speeded up relieving some of the pressure on stockpiles.

With an improving ore supply the Steel Co. of Canada Ltd. sees good chances of keeping present blast furnaces in full production and also feeding its new 1200-ton furnace slated to blow in before the year's end.

No Hitch Seen — New wage schedules for Canadian steel workers have not yet been fully ratified by the CIO Steel Workers Union members. But no hitch is expected. As a result of increased wages and soaring production costs, Canadian steel producers are giving serious thought to new price schedules. Advances are slated for base prices as well as extras. It may be 2 or 3 weeks before new price lists are whipped into shape and made available to the trade.

It is not expected that increases here will be on as elaborate a scale as those in the U. S. Canadian steel producers are not handicapped by price controls. But when making changes the usual procedure is to consult the Steel Controller in Ottawa.

Conforming to the practice of the past several years, steel producers do not give firm prices on forward delivery business. They continue to make prices known at time of delivery.

Shareholders Blessed — Dividend payments by Canadian corporations for the month of August are the highest for any similar month in history, totalling $26,697,239 and compare with $25,864,471 for August, 1951 and with $15,086,463 for August, 1950.

Cumulative total for the first 8 months this year was $343,909,747, against $322,349,610 for the 1951 period and $277,405,604 for 1950.

"I've been told that a time limit has been placed on my talk."

Autos in Comeback—The automotive industry is swinging back into operation after premature and prolonged holidays as a result of materials shortages stemming from the U. S. steel strike.

Chrysler Corp. of Canada resumed work at Windsor Aug. 13 with its 3700-man working force after a shutdown which began July 11. Officials said that because steel supplies still are scarce, production might be held temporarily to a lower rate. The company will build as many vehicles as it has steel.

All Lines Active—General Motors Corp. of Canada resumed car and truck production at Oshawa, Aug. 11, on a two-shift, full-time basis, with no alteration to schedules. The passenger car line has been cut since July 25—the regular vacation period. The truck line was forced to close 3 weeks earlier because of lack of material.

Ore to Bethlehem — Argonaut Iron Co. Ltd., operating in British Columbia, made its first shipment of iron ore to eastern United States steel mills last week. The company has entered into an indefinite period contract with Bethlehem Steel Co., for two shipments of iron ore a month.

Uranium Rush — The staking rush which started a couple of weeks ago in northern Saskatchewan now has spread into Alberta. This latest rush is for uranium and already upwards of 900 claims have been registered. Most of the claims staked are located about 70 miles northwest of Goldfield.

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a few words about alloy steels

or, where you can use Boron Steels, we can help you

If you are faced with the problems of allocations and shortages of the alloy steels you've been accustomed to use, you can probably make your job easier by shifting to Republic alternate grades or *boron* type alloy steels.

Republic has been producing boron steels commercially for more than 10 years. In that time we have made more tons of boron steels than any other alloy producer. Which means that we have solved more problems of shifting to boron alloys, have assembled more knowledge about the boron grades than any other producer.

Our 3-Dimension Metallurgical Service can give you the help you need to switch your production to alternate alloys or boron steels quickly and with the fewest headaches. A Republic Field Metallurgist analyzes your products and production set-up right in your plant. Then he goes over your case with the other two members of the 3-Dimension team... the Republic Mill and Laboratory Metallurgists.

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Boron steels aren't always the answer, may not solve every problem . . . your Republic Field Metallurgist will give you honest advice, backed by Republic 3-Dimension Metallurgical Service.

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originators and pioneer developers of

APEX bit holders

Want to lower your fastening costs? Reduce your bit inventory? Save on tool costs and conserve steel? Then switch—now—to Apex bit holders and insert bits.

Any one Apex bit holder will accommodate a full range of Apex insert bits to drive Phillips, Frearson (Reed & Prince), Slotted, Clutch Head or Socket Head screws. Bits "float" slightly in the holder, assuring easier alignment with screw recess, increasing bit life. Because the bits can be quickly and easily interchanged, you need only a minimum bit inventory to meet all your screwdriving requirements.

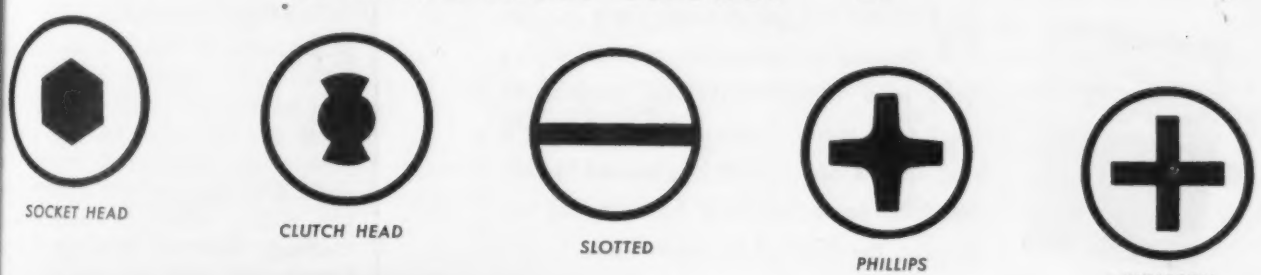
Bit holders, made to fit all popular makes of air, electric or spiral drivers, last indefinitely. When bits become worn, simply discard them —it costs no more for a new Phillips or Frearson insert bit than it would to recondition a standard power bit.

The same Apex insert bits may also be used with Apex hand drivers and service drive bit holders. Complete specifications and prices are shown in our new Catalog 26 — write, on your company letterhead please, for your copy.

U. S. Patent
No. 2,522,217
Canadian Patent
No. 440632

and insert bits

to drive these screws:



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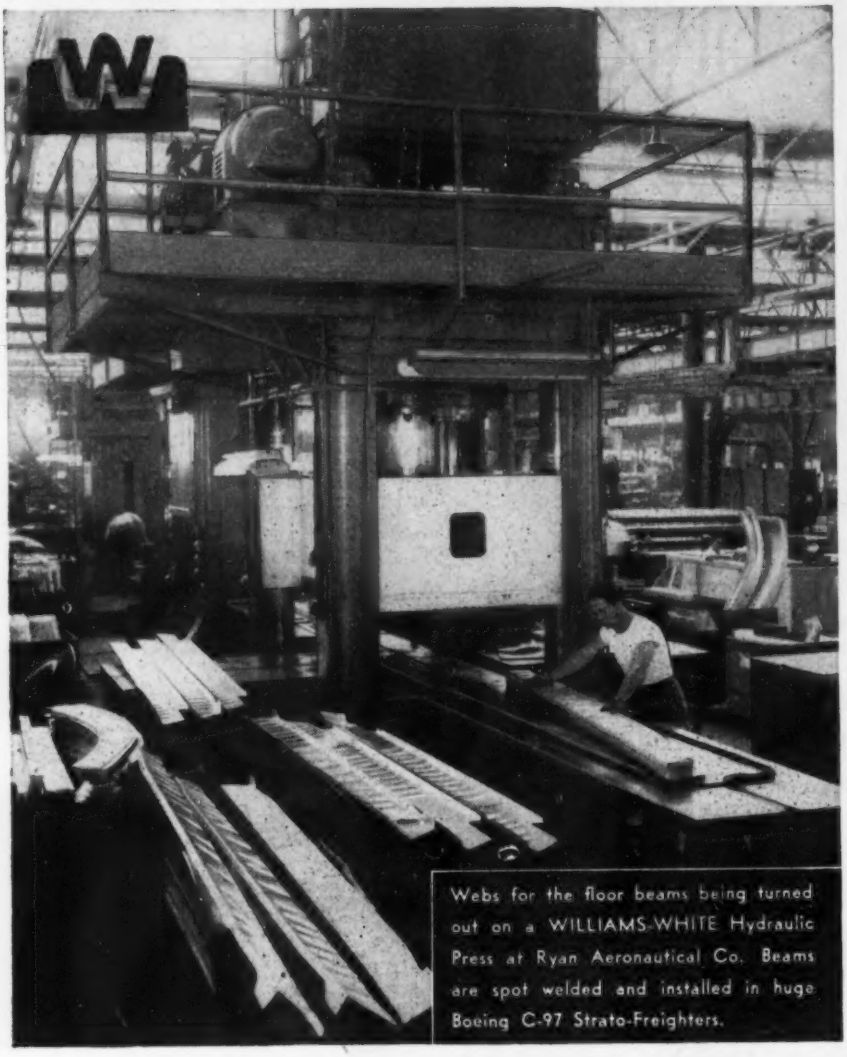
Wings for an Air Freighter . . . . *on a* WILLIAMS-WHITE PRESS



Webs for the floor beams being turned out on a WILLIAMS-WHITE Hydraulic Press at Ryan Aeronautical Co. Beams are spot welded and installed in huge Boeing C-97 Strato-Freighters.

Whatever size job you may have . . . for defense or commercial production . . . there is a WILLIAMS-WHITE machine to meet your needs. Every WILLIAMS-WHITE machine is a custom built job, tailored to your individual needs. All over America they are meeting the demand for production.

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Continued

Refractories

In buying refractories the trend away from the idea that the mo economical refractory is the o with the lowest initial cost. Mou ing costs of labor and producti make it necessary to select uni having the lowest overall cost terms of increased life and numb of manhours required for instal tion and maintenance. Chas. Tayl Sons Co. believes its furnaces, co sidered in these terms, rank amon the most economical on the mark and tell why in an interesting ne bulletin. *Chas. Taylor Sons Co.*

For free copy circle No. 14 on postcard, p.

Induction motors

Weatherproof induction motors ar featured in a recently issued folde available from Elliott Co. Rangin in size from 250 to 4000 hp, 2 pole and 50 to 3000 hp, 4 to 14 poles, th fabricated steel construction of th motors makes them ideal for out door service. *Elliott Co.*

For free copy circle No. 15 on postcard, p.

Bearings

The most recent catalog of Buntin Brass & Bronze Co. covers bearing for almost every purpose. Listed ar 854 different sizes of standard stock bearings, 324 different electric mo tor bearings and 263 sizes of tubu lar and solid bronze bars. *Bunting Brass & Bronze Co.*

For free copy circle No. 16 on postcard, p.

Salvage welding

Importance of tool and die salvage welding has become greater than ever as a result of the current steel shortage. In a new well illustrated manual the problem is treated in an informative "how to do it" man ner which makes for interesting reading. *Eutectic Welding Alloys Corp.*

For free copy circle No. 17 on postcard, p.

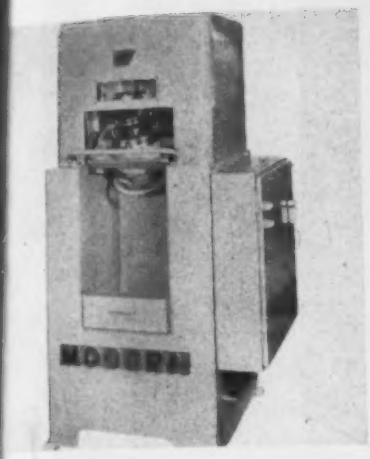
Lathes, grinders

The complete line of Rivett lathes and grinders is illustrated and de scribed in a new bulletin. Specifica tions are included for all units and the company's toolroom lathes are guaranteed to turn or bore within 0.0001 in. in 6 in. *Rivett Lathe & Grinder, Inc.*

For free copy circle No. 18 on postcard, p.

NEW equipment

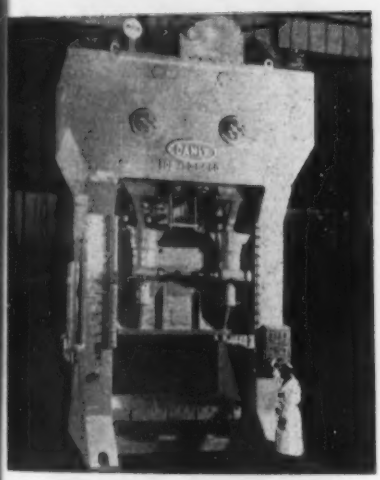
New and improved production ideas, equipment, services and methods described here offer production economies . . . fill in and mail postcard on page 89 or 90.



High speed machines chamfer zerol gears

New Burr-Master Model BM-2055 deburrs and chamfers tooth edges at both heel and toe of an 8-in. diam, 99 tooth, 12.53 pitch aircraft zerol bevel reduction gear in 30 sec cutting time. Pressing the cycle start button on the machine brings the work into cutting position by a pneumatic cylinder. Teeth are chamfered by rotating the work in timed relation to the cutting action of four dovetail-type high speed steel form tools. These tools are actuated by a combination rocker arm motion that gives a generated cutting action and leaves a burr less chamfered surface. The zerol bevel gear is located in the fixture by a pilot. Three spring loaded locators are provided for radial location. In actual operation, the head of the machine is enclosed with a guard having sliding doors for operator safety. Machine weighs 2200 lb and is powered by 1200 rpm, 1 hp motor. *Modern Industrial Engineering Co.*

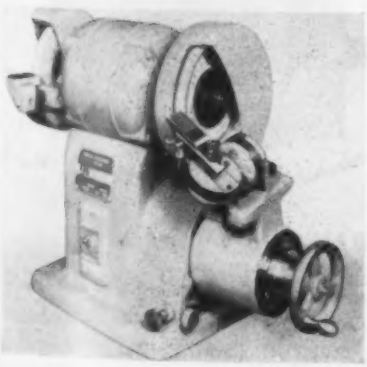
For more data circle No. 19 on postcard, p. 89



Double action press increases production

New features of double action press design are incorporated in a 450-ton straight side press. A Dynamatic clutch varies the linear stroking speed during the press cycle. Waste motion is taken out of the cycle so that the press operates at the fast rate of 14 strokes per min. Slide speed during draw is held to the slow speed of 60¼ fpm. Motor adjustments to both the inner and outer slides are provided. The outer slide, or blankholder, has provision for a ¼ in. pinch adjustment which can be made at each corner of the blankholder, allowing for uneven draws. Central lubrication system uses oil pump and filter unit to distribute clean, circulating oil to all working members of the drive. Oil is piped under pressure to bearings of flywheel and driveshaft, and to gear teeth. The bed meets prescribed limits of deflection; is installed without a pit. *Danly Machine Specialties, Inc.*

For more data circle No. 20 on postcard, p. 89



Chaser sharpener has universal application

This low cost space saving machine for resharpening chasers is equipped with new J&L chaser grinding fixture and adapters. It is claimed to do an outstanding job on all sharpening operations for both tangent and radial die chasers. Adapters for J&L chasers are available from stock; adapters for other chasers can easily be applied to the J&L chaser grinding fixture. Machine will duplicate desired grinds repeatedly. It is a precision machine tool equipped with necessary stops and controls. Simple, direct methods speed up the operation and cut costs. An inexperienced operator can learn in a few minutes to resharpen chasers. *Jones & Lamson Machine Co.*

For more data circle No. 21 on postcard, p. 89

Turn Page

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Saves on power costs under load — and during idle and no-load periods!

Cuts maintenance costs and downtime delays — has no moving parts to wear out!

Protects the primary input line against unbalanced conditions!

New P&H DC Rectifier Welder with Dial-lectric Control

. . . Gives you economy, quiet operation, balanced-line loading, and instantaneous remote control

Now . . . you get low-cost DC welding current without a generator, from this new P&H DC Rectifier Welder — industrial twin to the famous P&H AC Dial-lectric Welder.

No troublesome mechanical devices to control amperage — simply turn a single radio-type knob. There are no moving coils or cores to cause delays and maintenance expense — no bearings, brushes, commutator, brush riggings, etc. to replace.

P&H extra-value features like these make this DC Rectifier a real buy: Thermal overload protection. Weather-proof housing. Primary line switch. Range switch. Remote control receptacle. Forced air ventilation. Hinged side covers. Heavy-duty lifting eyes.

New P&H Rectifiers are coming off the production line now. Two sizes: 200 and 300 Amps at 40 V. Be among the first to enjoy the savings this P&H welder helps you realize on power consumption and maintenance. Order your P&H DC Rectifier Welder today.

Ask your P&H representative or distributor for further information on this outstanding unit.

Here's low-cost DC welding power at its best — the P&H DC Rectifier Welder. Note the sturdy construction and absence of moving parts.

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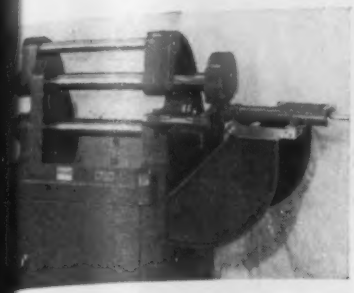


Heavy duty machine speeds wire cutting

High production capacity and easy setup for adjustment of wire length are features of a new machine for cutting black tempered and other straight wires. Cutting capacity varies to 150 lb per hr depending on length of wire desired and the operator. Machine can be set to cut any length of wire. Two 8-in diam rotary tooth-type cutters are made of ground high-speed steel. Three-in. diam shafting, turned and ground, runs in Oilite and ball thrust bearings. *Carlson Tool & Machine Co.*

For more data circle No. 22 on postcard, p. 89

Pocket tumblers handle small parts

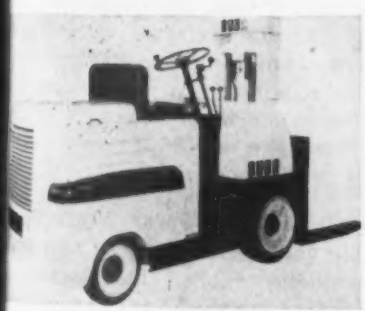
New tumbling barrel having individual pockets for tumbling two to six items at a time is recommended for deburring, precision finishing and polishing small metal and plastic parts. The pocket tumbler comprises a rotating container, or frame, into which the pockets fit. Both pockets and frame are hexagon-shaped and the frame is enclosed on five sides during tumbling to hold the pockets in. Pockets range from 12 to 16 in. diam. Outer box-container holds water. *Tumb-L-Matic Inc.*

For more data circle No. 23 on postcard, p. 89

Riveter features rotating impact plus control

Incorporating a new spindle designed to minimize impact noise, an improved pneumatic riveter features a rotating hammer, blows of which can be carefully regulated as to force, rapidity and duration. The Airflex pneumatic method tends to cushion and distribute the blows. As the peen rotates, only a small cross-sectional area of the rivet head is subjected to the force of each blow. This method eliminates the possibility of bent rivets, improperly formed heads, flaking metal, loose joints, broken or marred pieces. Airflex riveters are semi-automatic. Equipped with an air timing valve, the riveter goes through a cycle of operation in response to the touch of a foot pedal. Force of the blow and hammering speed may be regulated independently of each other. Ranges are 5 to 8 psi, 6000 to 16,000 strokes per min. Vertical and double-end models are available. *Lemert Engineering Co.*

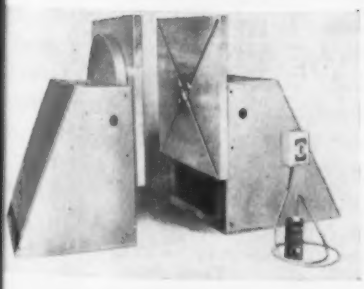
For more data circle No. 24 on postcard, p. 89



Fork lift truck powered by gasoline or Diesel

The first 6000-lb capacity fork lift trucks manufactured by Buda are available in two models: gasoline or Diesel powered. Trucks are rated at a 24-in. load center and are available with a choice of two gasoline or two Diesel engines: 6 or 4 cylinder engines. Additional features include accessibility of all parts for service and maintenance; complete complement of electrical gages on full front vision instrument panel; automotive type single lever gear shift mounted on steering column, and quick change heavy duty industrial type clutch. *Buda Co.*

For more data circle No. 25 on postcard, p. 89



Positioner rotates large pieces between centers

Purpose of a new head and tail stock positioner is to rotate large pieces between centers. Tables are the face plates and the work-piece is attached to them. Rotation is in one plane only, the horizontal rotational axis. The operation is similar to a lathe except the speeds are much slower, 1.13 rpm constant speed, and they are primarily for welding, either manual or automatic. Three models have 5000, 12,000 and 32,000 lb capacities. *Aronson Machine Co.*

For more data circle No. 26 on postcard, p. 89
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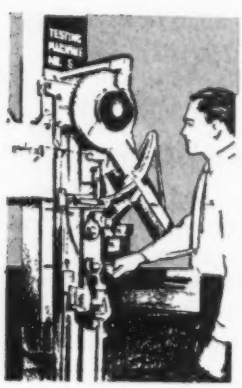

Johnson XLO Music Wire, "the wire of a thousand uses" —high-grade springs and wire forms difficult of formation. Johnson makes this wire better in order that your products may be better. Where service required is exacting, you can depend on Johnson XLO Music Wire.

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Worcester 1, Massachusetts

SUBSIDIARY OF PITTSBURGH STEEL COMPANY

Miter machine

This new machine will cut two 45° miters in a flash on plastic, wood or aluminum molding. It is provided with a steel scale to set gage to length. Power is supplied by ⅓ hp capacitor motor, 1725 rpm, driving spindles on precision ball bearings, with two 7-in. diam steel saws placed closely to prevent waste. Foot or hand lever are available. *Approved Devices Co.*

For more data circle No. 27 on postcard, p. 1

Hydraulic dock ramp

Meeting specifications of railroads and the switchmen's union, a new ramp for use in loading and unloading freight cars is flush with the top of the dock and flush with the front edge of the dock. Unit is set within a pit 6 ft 10 in. long x 2 ft 8½ in. deep, with two widths of 42 in. and 5 ft. An auxiliary ramp goes outward from under the main ramp for total horizontal travel of 48 in. Ramp moves upward and downward 24 in. and standard unit has roll-over capacity of 12,000 lb. *Beacon Machinery, Inc.*

For more data circle No. 28 on postcard, p. 1

Valve shield

Called Chex Spray, a new flexible valve shield made of neoprene synthetic rubber has been announced for use on valves handling acids and other hazardous chemicals. It protects operator from injury if valve stem packing should fail. It cups the stem and packing gland preventing acid from spraying on the operator. Shield is molded in shape of a flower pot; can be installed while the valve is in service. *Industrial Products Co.*

For more data circle No. 29 on postcard, p. 1

Turn Page

low cost heavy duty service with Foote Bros. MAXI-POWER

Costs go down when Foote Bros. Maxi-Power drives are installed! These rugged helical gear drives assure high efficiency — low maintenance costs — operate day after day, year in and year out without trouble and with minimum maintenance.

Precision-Generated Helical Gearing with uniform load distribution across the entire face permits maximum load carrying capacity in minimum space and assures the maximum in reliable, uninterrupted performance.

These drives are available in single, double and triple reductions, with ratios ranging from 2.08 to 1, up to 360 to 1. Capacities up to 1550 h.p.

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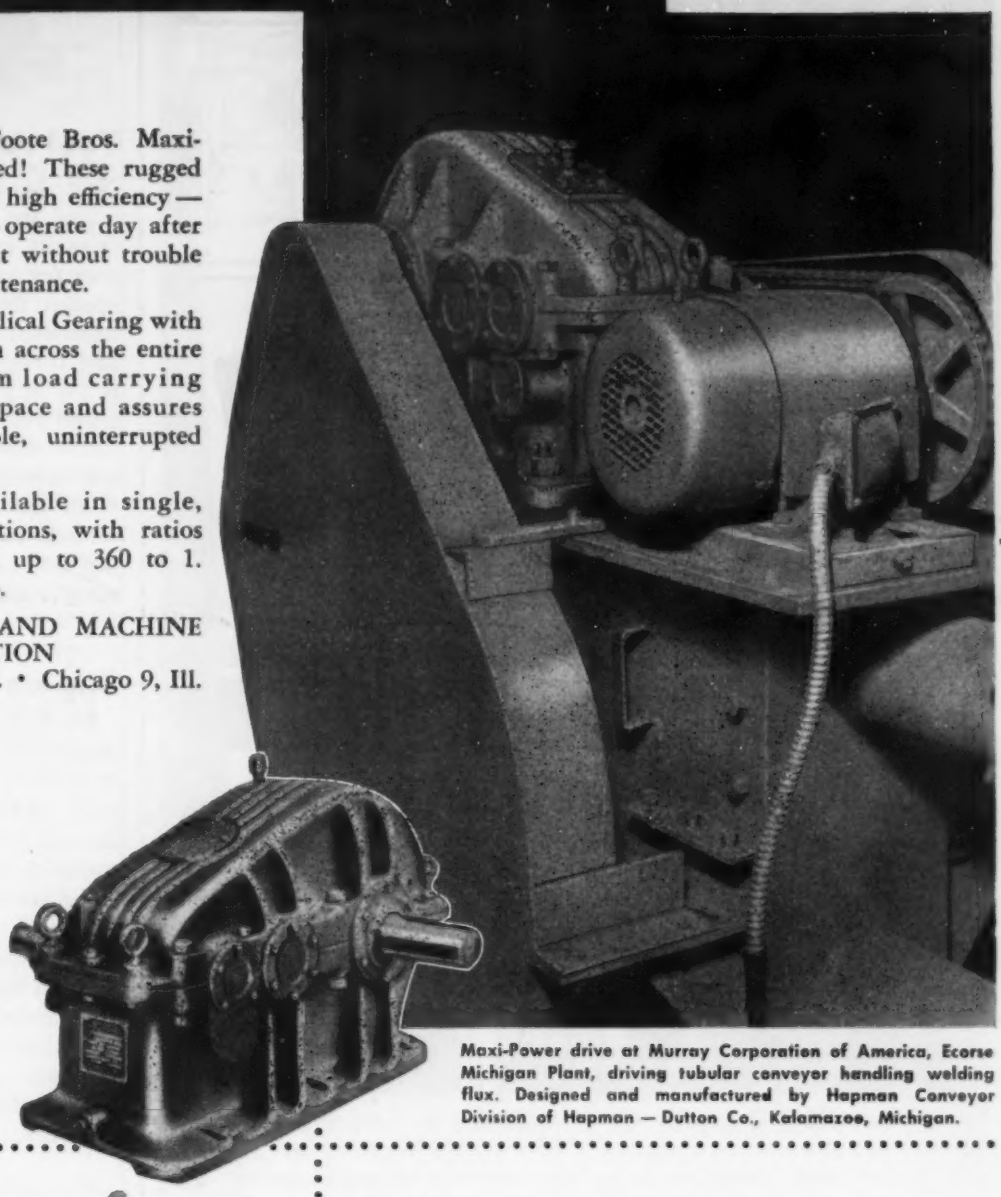

Maxi-Power drive at Murray Corporation of America, Ecorse Michigan Plant, driving tubular conveyor handling welding flux. Designed and manufactured by Hapman Conveyor Division of Hapman — Dutton Co., Kalamazoo, Michigan.

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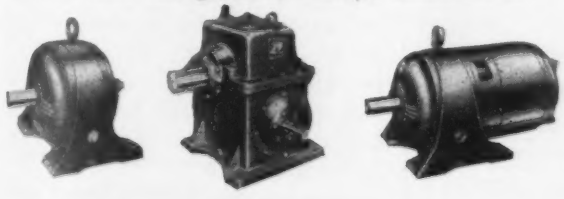
Better Power Transmission Through Better Gears



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MINIMIZE YOUR "UPS" AND "DOWNS"

Those moves of material "up" — "down" — "in" — "out" — "across" and "back" can't be avoided — but their cost can be minimized.

It's largely a matter of proper selection of cranes, hoists, etc., as to type, construction, cost of operation, freedom from repairs, etc.

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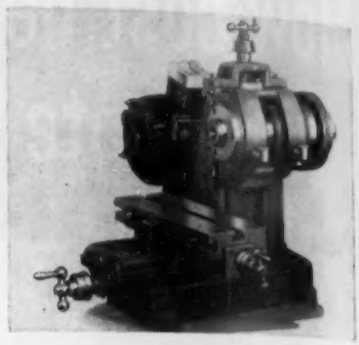


Tool room miller

New bench-type miller specially suited for small run precision jobs is easily set up and easily changed over for work on different tools and special fixtures. Features include micrometer calibrated feed screws and three-way travel. Head travel is 3¼ in.; table travel 5 in.; saddle travel 3 in. All travels can be locked. Table measures 4 x 12 in. Work can be held to very close tolerances. High spindle speeds permit use of carbide cutters. *Barker Engineering Co.*

For more data circle No. 30 on postcard, p. 89

Slip-on fittings

Nu-Rail slip-on fittings simplify structural pipe work with savings up to 80 pct on labor. They eliminate threading or welding and save on cutting pipe. Made of corrosion-resistant aluminum alloy, there are five basic fittings plus a floor and wall flange and a drive fit end cap. They fit standard pipe in sizes ¾ through 2 in.; may be used individually or in combination. Slip fit feature provides easy assembly and disassembly. *Hollaender Mfg. Co.*

For more data circle No. 31 on postcard, p. 89

Armored cable

BX armored cable in sizes 14 to 10 Awg now utilizes a glass braid instead of cotton. Glass braid is inorganic, will not rot and is flameproof; makes possible a smaller overall diameter. Cable fits all standard fittings; is listed by Underwriter's Laboratories, Inc. *General Electric Co.*

For more data circle No. 32 on postcard, p. 89

Preservative oil

For use in the engines of vehicles scheduled for storage or shipment, a new dual-purpose product functions both as a lubricant and as a preservative. It eliminates the need for handling two products successively. Texaco preservative oil 10, and 30, combine special additives developed to insure maximum preservation of internal engine surfaces with motor oil additives of the type used in heavy duty lubricants. When functioning as a lubricant the preservative oil need not be changed until the engine has reached the normal drain-and-refill point. *Texas Co.*

For more data circle No. 33 on postcard, p. 89

Spotting simplified

When tractors are not immediately available to spot semi-trailers at a loading dock, a new attachment for fork-lift trucks will do the job. The simple device slips over the forks of the lift truck, where it is securely fastened by a chain. A cross member, having 3-in. hole in the center, serves as the engaging plate. It is designed for use on 6000 to 10,000-lb-capacity fork-lift trucks. *Clark Equipment Co.*

For more data circle No. 34 on postcard, p. 89

Pipe threader

Alemite lubricated, the new Quijada Chief pipe, bolt and conduit threader has a power-operated chuck with a finger-tip control. A flip of a switch and four jaws, front and rear, automatically grip and center the pipe. Pipe or conduit range is ⅜ to 2 in.; bolt range ⅜ to 1¼ in. *Quijada Tool Div., Gaines-Collins.*

For more data circle No. 35 on postcard, p. 89

Turn Page

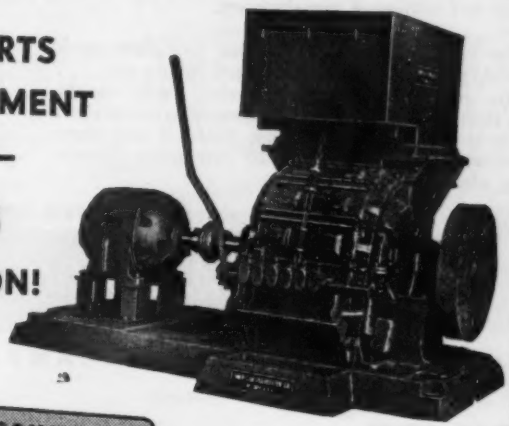
More "CRUSHING" FACTS ON American CRUSHER PERFORMANCE

Case History No. 14

American METAL TURNINGS Crusher

AVERAGES 1000 TONS MONTHLY

. . . PARTS REPLACEMENT COST — $0.03 PER TON!



PERFORMANCE DATA

PROBLEM: To reduce machine turnings to shoveling chips.
INSTALLATION: American Metal Turnings Crusher #3800.
AGE: 6 years in operation.
TONNAGE: Average 1000 Tons Per Month
TOTAL PARTS TO DATE: $2,028.30.
PARTS COST PER TON: $0.03

This performance record of a well-known Detroit manufacturer is familiar to other American Crusher owners, who have long since learned that there are 3 significant profit sources in every American installation: (1) American-reduced chips bring $4 more per ton in the scrap market, (2) Chips release up to 50 gallons per ton in recovered cutting oil, (3) Chips require less storage space . . . are easier to handle.

WRITE for Metal Turnings Crusher Bulletin.

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1439 MACKLIND AVENUE ST. LOUIS 10, MO.

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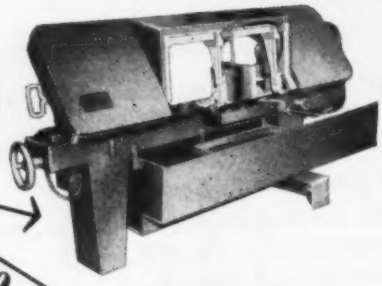
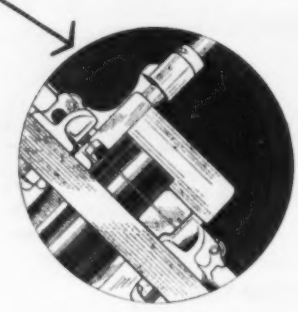
Green Instrument Company
INCORPORATED

365 PUTNAM AVENUE • CAMBRIDGE, MASS.

you can see the CUTTING ACTION



Kalamazoo
METAL CUTTING BAND SAW



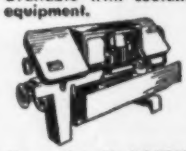
Yes . . . you can look directly down into the cut as it's being made, giving you instant warning of any need for adjustment. And blade wear and dullness can be quickly detected, too. Result? Faster, cleaner precision cutting, longer blade life.
Investigate the many other exclusive Kalamazoo Band Saw features that give you lowest cost metal cutting. Three sizes, all available with coolant equipment and casters.

MACHINE TOOL DIVISION
Kalamazoo TANK and SILO CO.
816 HARRISON ST., KALAMAZOO, MICHIGAN

Remember . . . there's a *Kalamazoo* Metal Cutting Saw to fit your exact needs

Model 610 cuts 6" round and 6" x 10" flat. Coolant equipment available.

Model 816 cuts 8" round and 8" x 16" flat. Model 824 cuts 8" round and 8" x 24" flat. Both models are available with coolant equipment.



Heavy-duty Model 1220 cuts 12" plus on rounds and 12" x 20" flat. Available with or without coolant equipment.

—New Equipment—

Continued

Counterweight

For stevedoring and other applications where the operating weight of a fork truck may exceed ship's hoist or elevator capacity, Yale fork lift trucks are available with an easily detachable counterweight. The cast iron counterweight, which accounts for a large part of the truck's operating weight, is held in place by guide pins and heavy steel brackets. It can be removed or attached in less than 1 min, using either another fork truck or a hoist. The truck illustrated is diesel powered and is equipped with special vertical exhaust stack specified by customer. *Yale & Towne Mfg. Co.*

For more data circle No. 36 on postcard, p. 89

Cleaning compound

A free rinsing, readily soluble liquid steam cleaning compound is said to be safe on reactive metals and painted surfaces. Non-hazardous, non-flammable Turco 3232 affords efficient, speedy, economical removal of light to medium soil deposits. Its emulsifying action enables oil and grease-bound dirt to be freely rinsed away. *Turco Products, Inc.*

For more data circle No. 37 on postcard, p. 89

Profile wheels

Worm face profiled gear grinder wheels are available in popular make gradings and pitches. These profiled wheels are accurately formed, with proper root clearances, minimizing root crushing. Wheels require a minimum of dressing; are readily remounted on a machine because the worm form profile is held square and parallel with the bore and face. *Jerpbak-Bayless Co.*

For more data circle No. 38 on postcard, p. 89

Turn Page

Eyelets?
Eyelet machine products?

Here, illustrated full size, are some examples of the parts we make—in a wide variety of metals and finishes. Some are of simple design . . . others are intricate, precision-made parts for industrial, electrical and scientific purposes.

We'll be glad to quote on your requirements, and have thousands of stock tools which may save tooling-up charges. Just send us a sample, drawing or description, together with quantity and other pertinent information.

THE AMERICAN BRASS COMPANY,
Dept. WBG, Waterbury 20, Connecticut. 51269

for eyelet machine products
it's **ANACONDA**

COPPER • BRASS • BRONZE • NICKEL SILVER
NICKEL • IRON • STEEL • STAINLESS • ALUMINUM

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Write for Catalog 46

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MECHANICAL TUBING

PROMPT DELIVERY FROM STOCK

Call Murray's nearest warehouse for seamless cold-drawn mechanical tubing in carbon steel; also for seamless or welded stainless tubing in many analyses; size range . . . 1/8- to 14- inch O. D.

For aid in finding the tubing best suited to your particular need, consult a Murray representative. He may help you uncover new economies in the purchase of mechanical tubing.

WRITE FOR CURRENT STOCK BULLETIN

Other Murray products include carbon steel tubing and pipe for mechanical and pressure purposes; Welding and screw type pipe and tube fittings. Tube bending, upsetting, swaging.

A B MURRAY CO INC

ESTABLISHED 1845

ELIZABETH, N. J. McKEESPORT, PA.

—New Equipment—

Continued

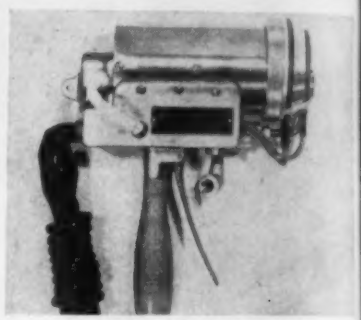
Abrasive belt

New coated abrasive polishing belt uses granulated cork rather than conventional mineral grains for obtaining a very high luster on glass, metal, plastic and ceramics. The cork surface is sized with resin combined with a polishing agent that is said to improve the polishing action. Belt has water-proof, cloth backing. *Minnesota Mining & Mfg. Co.*

For more data circle No. 39 on postcard, p. 19

Spray gun

A wider range of materials can be sprayed with an improved model of the Spray King, designed for spraying low melting alloys and metals. In addition to the internal heating element, a nozzle heating element prevents metal cooling at



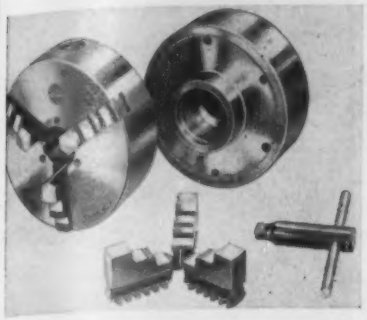
the nozzle and assures continuous uniform spray. It is believed this gun will provide the answer to those marginal alloys in the 500° to 650°F which have been difficult to spray. The gun is suitable for intermittent or production spraying. *Cooper Alloy Foundry Co.*

For more data circle No. 40 on postcard, p. 19

Perpetual calendar

Determining the day of the week for any date since the beginning of the Gregorian Calendar can be done in a matter of seconds on a new perpetual calendar, that extends from 1753 to 2059. The system consists of two parts. The first is a table that assigns a key letter to each of the year. Second part correlates year letters with the 12 months, and shows complete layout of any month in any particular year as it would appear on the page of an ordinary calendar. *General Electric Co.*

For more data circle No. 41 on postcard, p. 19



Universal chuck

New 6-in. three-jaw universal chuck has threaded body back for direct mounting on lathes, milling machines, grinders, and other machine tools with 2½ in.-8 spindles. Since no adapter is required, the chuck is mounted close to the spindle bearing, minimizing chatter which may be caused by excessive overhang. *Westcott Chuck Co.*

For more data circle No. 42 on postcard, p. 89

Core bonding resin

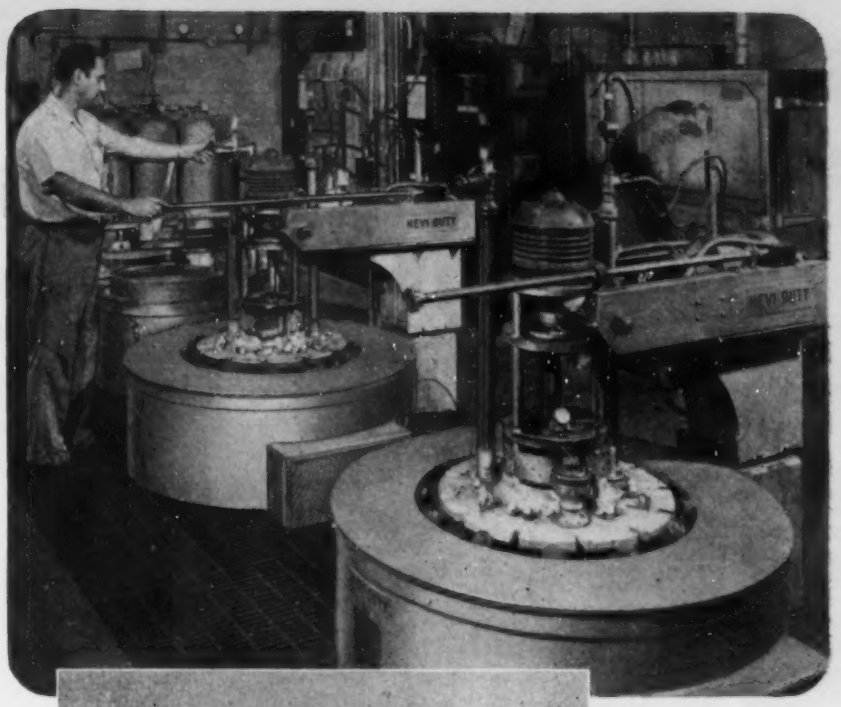
Development of a powdered phenolic core bonding resin suited to curing in di-electric ovens has been announced. The product, Thor plastic binder FB-111, is said to respond well to temperatures characteristic of di-electric core ovens, has long stable storage life, and imparts green strength to the uncured core. *Chemical Div. Borden Co.*

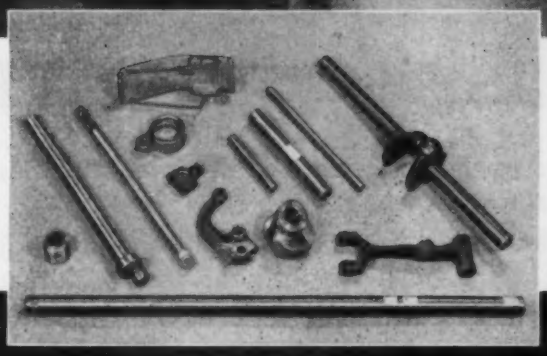
For more data circle No. 43 on postcard, p. 89

Porosity-free welds

Weldaluminite, a new fusing agent and deporosite, extends the application of inert arc welding to rimmed steel producing sturdy, quality welds free from porosity. The product contains aluminum which deoxidizes the weld pool and is so formulated that it retains the aluminum at the point of welding. No gas bubbles rise to the surface of the pool to cause turbulence. As a result, porosity is eliminated, the arc is stabilized. Weldaluminite is either sprayed or brushed on and allowed to dry before welding is begun. Free working sample is available—state type of work being done. *Spekaluminite Co.*

For more data circle No. 44 on postcard, p. 89





Typical parts heat treated in Hevi Duty furnaces at the Union Special Machine Co.

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heat treats precision parts in
HEVI DUTY FURNACES

● Over 100 different heat treating operations are represented in one Union Special industrial sewing machine. All the carburizing, dry cyaniding and bright annealing of precision ground shafts, bearings, journals, castings and eccentrics is done in versatile Hevi Duty Vertical Retort Furnaces.

Walter Weinwurm, chief metallurgist at Union Special, says "Our Hevi Duty furnaces do an exceptionally good job of heat treating precision parts. The work comes out of the furnaces clean with no scale or oxidation."

Learn more about Hevi Duty vertical retort furnaces — write for your copy of bulletin HD-646 today.

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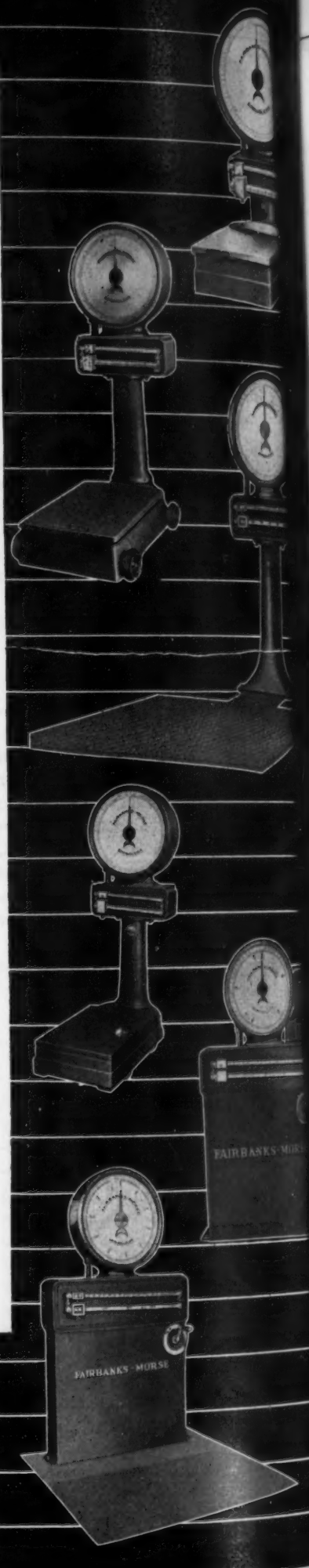

The Iron Age

SALUTES

Eugene J. Houdry

No ivory-tower lab researcher, he has devoted half his life to opening up new frontiers in catalysis.

IN THE Hollywood tradition, the celluloid scientist usually appears as a well-intentioned foggy soul, with a penchant for wearing his horn-rims on top of his head.

Far removed from these basic specifications is world-famed scientist-inventor Eugene Houdry. A vigorous, well-built man, whose appearance belies his 60 years, he probably knows more about catalysts than anyone else in the world.

A native of France, his discovery of a catalytic cracking process for petroleum brought him to the U. S. in the Thirties. Sun Oil Co. was the first to see the merits of the Houdry method and adopted it to produce gasoline on a vast scale.

During the war, Eugene worked on a catalytic method of making synthetic rubber and also produced carbon isotopes for cancer reasearch. Late in 1945, Secretary of State Stettinius sent Eugene to Moscow to study the country's petroleum problems.

After this exhausting junket and a long vacation in France, Eugene returned to his home and laboratory in Ardmore, Pa. From his lab work there came what is perhaps his greatest achievement—development of a catalyst to burn up carbon monoxide exhaust gas. The process has been adapted for industrial use to change offensive fumes into odorless, useful heat (THE IRON AGE, June 26, 1952, p. 26).

Success of the process has resulted in the formation of the Oxy-Catalyst Mfg. Co., headed by Eugene Houdry. With his two sons aiding him as vice-presidents of the firm, this far-sighted man of science appears certain to prove an exception to one of his favorite observations—that "too many inventors die broke."

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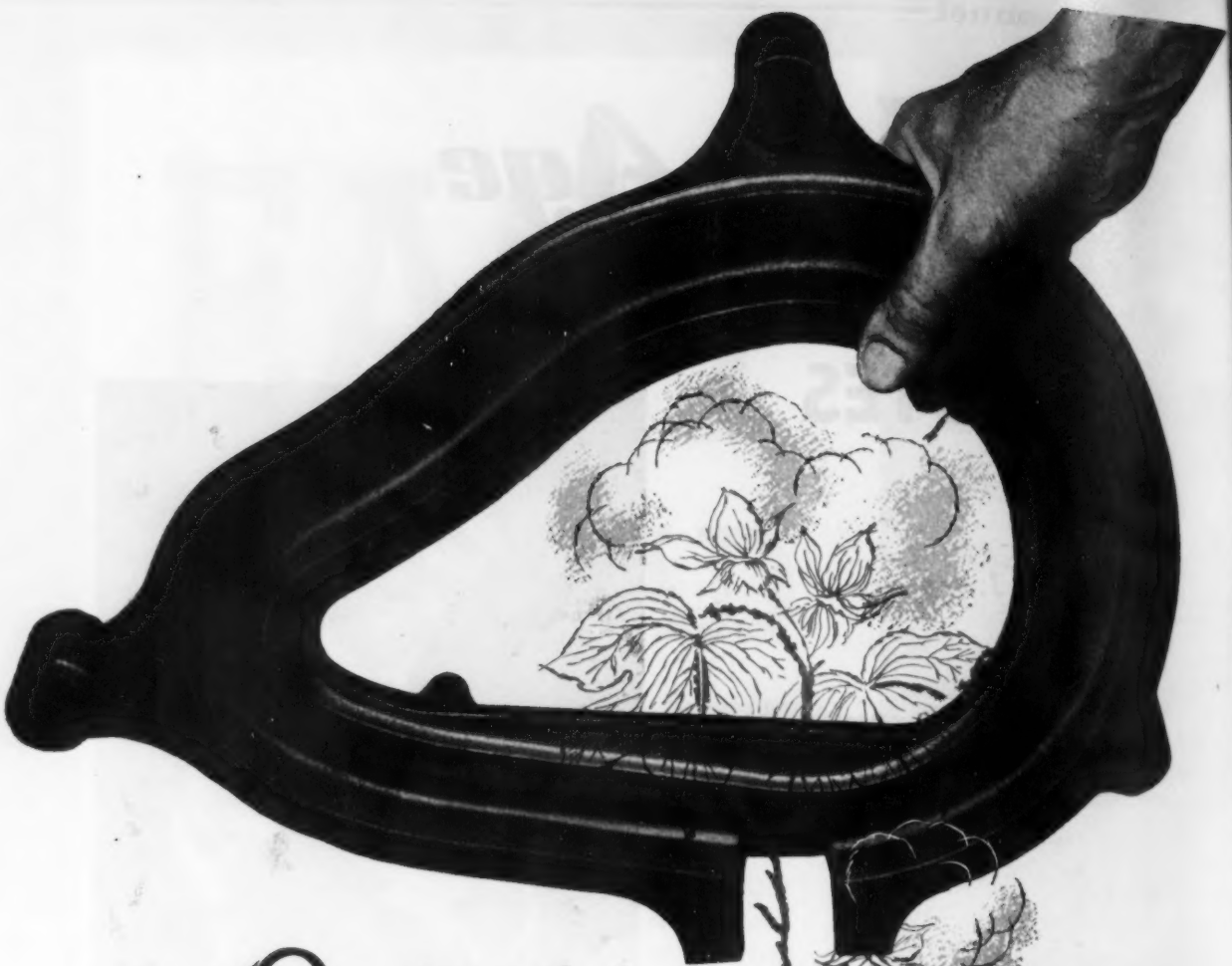

Quality Up,

costs and rejects down
WITH CRUCIBLE TOOL STEEL CASTINGS

The steel part shown above used to be a production headache. A cam for a cotton picking machine, it was originally flame cut from SAE 8730 boiler plate, machined and heat treated. Other difficult steps included end-milling and finish-grinding the cam track. Rejections were high, because the cam often warped during heat treatment.

The problem was solved by casting the cam in Airkool®, a Crucible air-hardening tool steel. When the customer receives the casting from Crucible, all he has to do is finish it, mill the cam track and heat treat. He doesn't have to finish grind – Airkool is non-deforming when properly hardened and tempered. Machining costs are way down and quality is up, since Airkool resists wear far better than the low alloy steel from which the part used to be made.

Crucible's casting facilities often make it possible to use wear- and abrasion-resisting tool steel for complicated machine parts. We may be able to help you just as we helped the cotton picking machine manufacturer. Get in touch with Crucible today!

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first name in special purpose steels

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CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

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The Iron Age

INTRODUCES

Fabian Bernstein, appointed research scientist, ALLIS-CHALMERS MFG. CO., Milwaukee; **John W. Dzimianski, C. W. Little, Jr.,** and **Ralph A. Person,** named research scientists also.

William Rogers Herod, elected a vice-president, GENERAL ELECTRIC CO., Schenectady.

Albert H. Behnke, elected a vice-president, PACKARD MOTOR CAR CO., Detroit; and **C. Wayne Brownell,** promoted to a vice-president.

Eric V. Murray, appointed executive assistant vice-president, ATLAS STEELS, LTD., Welland, Ont.

Erson V. Ogg, named executive vice-president and general manager, L. J. HOUZE CONVEX GLASS CO., Point Marion, Pa.

Ranson B. De Lisle, appointed vice-president in charge of sales, MID-CONTINENT COAL & COKE CO., Chicago.

J. L. Bauer, named assistant to vice-president and general sales manager, NATIONAL ELECTRIC PRODUCTS CO., Pittsburgh.

Henry C. Egerton, appointed treasurer, BULLDOG ELECTRIC PRODUCTS CO., Detroit.

Martin A. Elliott, appointed research professor of mechanical engineering ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago.

George S. Ford, promoted to manager of purchases, SOULÉ STEEL CO.

T. G. Ingram, appointed to newly created position of controller, AINSWORTH MFG. CORP.

Harry E. Sloan, elected chairman of the Board, CUSHMAN CHUCK CO., Hartford.

Walter Farnsworth, promoted to director of research, Allenport and Monessen Plants, PITTSBURGH STEEL CO.; and **Charles L. Labeka,** named chief metallurgist.

John E. Wray, appointed Division Industrial Engineer—Raw Materials, JONES & LAUGHLIN STEEL CORP., Pittsburgh; **Jack Cameron,** named superintendent, Millville, W. Va. Plant, Blair Limestone Div.; and **Paul L. Hoover,** appointed foreman and master mechanic to assist Mr. Cameron.

K. A. Smith, promoted to director of Light Oils Div., SINCLAIR RESEARCH LABORATORIES, INC., Harvey, Ill.

Robert A. McLaughlin, appointed director of sales, Fiber Glass Div., PITTSBURGH PLATE GLASS CO.

Charles W. Walton, appointed senior research analyst, CHEMICAL CONSTRUCTION CORP.

David Reid, named superintendent, Grain and Bond Plants, NORTON CO., Worcester, Mass.; and **Roger J. Dufresne,** named assistant to superintendent of Organic Products.

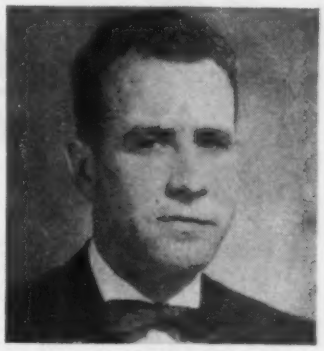
Roman Andrysiak, appointed superintendent of assembly, Detroit tank plant, CHRYSLER CORP. and **Martin Bizjack,** named superintendent of machining.

Raymond E. Lapean, named managing director, CYANAMID PRODUCTS LTD.

A. G. Nesse, named Chicago district sales manager, SHARON STEEL CORP.

Floyd R. Ridgley, promoted to superintendent, TEMCO AIRCRAFT CORP., Dallas.

THOMAS J. WOOD, appointed operating assistant to the president, of Brake Shoe & Casting Div. of American Brake Shoe Co., New York.



JOSEPH C. OLSON, named personnel manager, The Bullard Co., Bridgeport, Conn.

HARRY L. SMITH, JR., made staff manager, Product Sales, Aluminum Co. of America., Pittsburgh.

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Personnel

Continued

James F. Walters, appointed industrial sales engineer, THE PARKER APPLIANCE CO., Buffalo territory.

Leonard L. Robb, named head of sales, STEWART-WARNER CORP., Chicago.

Robert W. Ayling, appointed development engineer BRUNNER MFG. CO., Utica, N. Y.

Frank J. Leeming, joins Application Engineering Staff, SPRAGUE ELECTRIC CO., North Adams, Mass.

Glen McDowell, appointed sales manager, Rolls Div., BLAW-KNOX CO., Pittsburgh, and **J. M. Lewis,** made assistant in sales of Lewis Rolls.

Norman Pintchuk, becomes foundry metallurgist in stainless steel foundry, SOLAR AIRCRAFT CO., San Diego.

Joseph A. Tardiff, appointed area supervisor, HOOKER ELECTROCHEMICAL CO.; and **John D. Sweeney** also named area supervisor.

Russel T. Drennan, appointed sales manager, eastern district, Chemical Div., KAISER ALUMINUM & CHEMICAL SALES, INC.; and **Joseph A. Voss, Jr.,** also appointed sales manager.

Paul R. Larimer, appointed general sales manager, ANSUL CHEMICAL CO., Marienette, Wis.

Elmer H. Lanthorn, appointed general sales manager, BLACKMER PUMP CO.

W. S. McChesney, named manager of foil sales, ALUMINUM CO. OF AMERICA, Pittsburgh.

A. K. Tice, appointed national accounts and fleet sales manager for Sacramento, Calif. area, FRUEHAUF TRAILER CO.

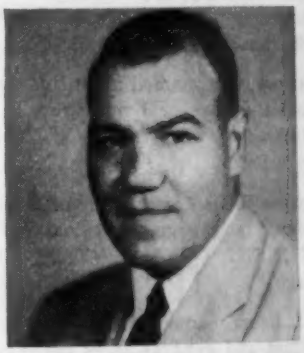
Hubert Fruehauf, named manufacturing manager, Magnesium Dept., THE DOW CHEMICAL CO., Midland, Mich.

Marshall C. Wells, appointed general sales manager, GOLDEN STATE APPLIANCE DISTRIBUTING CORP., Los Angeles.

Delmar R. Lammers, appointed service manager to assist in general service administration, CATERPILLAR TRACTOR CO.; **Merle W. Dargel,** becomes eastern division service manager; and **Theodore M. Fahnestock,** becomes service engineering manager.

HUGH SUTHERLAND LEWIS, appointed executive vice-president, Michigan Limestone Div., U. S. Steel Co.

ROGER MAGOUN, named economist, Norton Co. Worcester, Mass.



RAYMOND A. FRICK, appointed general works manager, Brake Shoe & Castings Div. of American Brake Shoe Co.

F. C. McNICOL, appointed division manager, Industrial Control Sales, Cutler-Hammer, Inc., Milwaukee.

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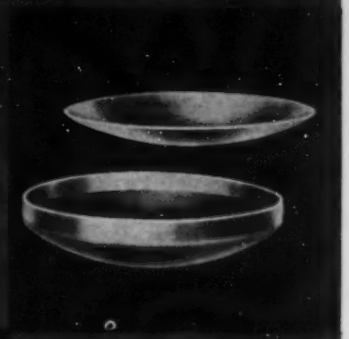
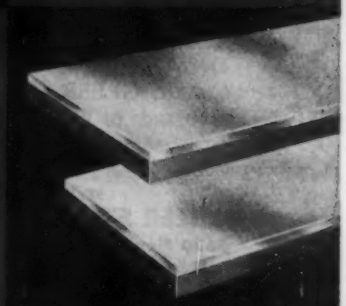
We would welcome an opportunity to show you how our specialized facilities can supply you with steel and steel products that are tailored to meet your most exacting specifications. For additional information write to Claymont Steel Products Department, Wickwire Spencer Steel Division, Claymont, Del.

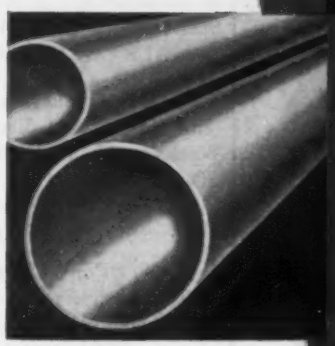


FLANGED AND DISHED HEADS

ALLOY AND CARBON STEEL PLATES



STAINLESS-CLAD STEEL PLATES



LARGE DIAMETER WELDED STEEL PIPE

THE COLORADO FUEL AND IRON CORPORATION—Denver, Colorado
THE CALIFORNIA WIRE CLOTH CORPORATION—Oakland, California
WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo
Chicago • Detroit • New York • Philadelphia

CLAYMONT STEEL PRODUCTS
PRODUCTS OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION
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Personnel

Continued

R. S. Hatfield, appointed general manager, North-Central district, CONTINENTAL CAN CO., New York; **Frank I. Gill**, named general manager, Mid-Central district; and **John L. Heinlein**, appointed general manager, South-Central district.

Albert H. Rogers, Jr., appointed manager, Philadelphia factory branch office, H. O. TRERICE CO.

John F. Kennedy promoted to assistant general superintendent of J-65 Sapphire jet engine project, BUICK MOTOR DIV., Flint, Mich.; and **Justus I. Taber**, named superintendent of Transmission Plant.

Horace W. Hooker, Jr., appointed assistant to general sales manager, HOOKER ELECTROCHEMICAL CO.; **Peter N. Maclaren**, named purchasing agent; and **Robert F. Schultz**, appointed assistant technical superintendent.

Harold Prince, appointed advertising manager, AMERICAN SILVER CO., Flushing, N. Y.

Roy Backman, named sales manager, PACIFIC AIRMOTIVE CORP., Burbank, Calif.; and **George T. Keller**, appointed sales manager.

Edward J. Hildebrandt, appointed general manufacturing manager, FORD MOTOR CO., Dearborn; and **Nevin L. Bean**, named manager of the production engineering Dept.

Paul Chisler, named manager of manufacturing procedures of new Stainless Steel Div., KENMORE METALS CORP., Jersey City, N. J.

Robert M. Sherman, named industrial medical director, Norwood Works, ALLIS-CHALMERS MFG. CO., Milwaukee.

OBITUARIES

W. W. "Pop" Cleveland, vice-president and special sales representative of Cleveland Pneumatic Tool Co., in a plane crash recently.

Louis Melvin Fuller, 71, president and founder of American Abrasives Co., Westfield, Mass., president of Cortland Grinding Wheels Co., and Hamilton Emery & Carborundum Co., both of Chester, Mass., in Boston hospital.

Herbert B. Lewis, 63, marketing service engineer, Market Development Dept., Lukens Steel Co., at Memorial Hospital, West Chester, Pa.

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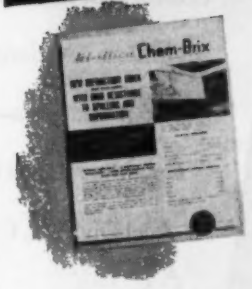

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REPUBLIC STEEL:

New Titanium Producer

By
V. W. Whitmer
Asst. Chief Metallurgist
and
T. E. Perry
Contact Metallurgist
Republic Steel Co.
Massillon, Ohio

Rollers of titanium ingots since 1948, Republic Steel is now in commercial production of pure titanium and two titanium alloys. They are producing ingots both by arc and induction melting and are marketing the product as bars, strip, plate sheet and forgings. The company had conducted basic research on furnace types and design and new equipment, not described here, will soon be installed. Their 7 pct Mn alloy after heat treatment shows a yield strength range from 120,000 to 160,000 psi.

Republic Steel Corp., long a leading producer of alloy, carbon and stainless steels is now producing titanium and titanium alloys at Canton, Ohio. This plant has been rolling outside titanium slabs since 1948 and melted its first experimental titanium ingot in Aug., 1950. For the past 2 yrs. Republic has been perfecting their melting equipment and techniques and supplying experimental quantities to the trade in a variety of products. Today, commercially pure and alloy titanium is offered in appreciable quantity and conforming to well defined physical specifications.

While an excellent core of information on titanium has been established the technology is dynamic. New information on fabrication, welding, heat treating, etc. is developed each day which both supplements, modifies and often outmodes previous data. Although sometimes perplexing, this is a healthy condition and should continue as the full maturement of titanium is realized.

Republic is using two types of melting equipment. Induction melting is carried out in a very dense grade of graphite under an atmosphere of inert gas—either argon or helium. Titanium is an extremely reactive metal at temperatures above about 1900°F and if not protected would absorb oxygen and other atmospheric gases during melting which would render the metal useless for structural applications.

Being almost the universal solvent in the molten state some carbon is always picked up from the graphite melting crucible. This carbon

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"Research Program on new furnaces and melting techniques is under way . . ."

may range from 0.40 to 1.0 pct. The effect of carbon in this range is to decrease ductility without appreciably effecting strength of commercially pure titanium. However, in the case of alloyed titanium the effect of carbon is largely masked and for some applications may actually be an advantage. Titanium alloys made by induction melting may be more homogeneous than those made by other methods and offer attractive applications for high strength forgings where ductility is of secondary importance.

Arc melting is employed when low carbon titanium is required. In this method specially prepared sponge is fed continuously into a water cooled copper crucible under an inert gas atmosphere, and melted with a direct current graphite or tungsten arc. The method takes advantage of the fact that molten titanium will not wet relatively cool copper. The titanium solidifies shortly after it becomes molten due to the rapid extraction of heat through the copper walls. The ingot is continuously built up, the electrode rising with the ingot height. A small amount of contamination from the electrode is always introduced in melting. The upper limits of this contamination being about 0.20 pct when graphite melted with the existing equipment shown in Fig. 1.

Republic has under way comprehensive research programs on new furnaces and melting techniques. Larger, more efficient units are planned which will soon produce more uniform alloys. Lack of uniformity, particularly in sheet and strip, has to date troubled all producers. Research on new types of electrodes, better and faster analytical procedures and best methods of utilizing scrap metal are a part of the overall program.

Melting rates of titanium by arc methods affected by various factors such as power input, current density, diameter of melting zone, number of electrodes and many others. These factors are all being investigated in the overall research program.

Republic has taken particular pains to fully analyze each and every ingot. Two special machines for oxygen determination are installed at Republic for this purpose. A separate laboratory is also employed full time to constantly check other elements contained in titanium alloys which are not as difficult to determine as the residual oxygen.

The raw material for the melting process is sponge containing 99.5 pct titanium. Sponge quality as purchased from Dupont is good and has been greatly improved in the last year or so. Because of the inherent nature of batch sponge production some variation is experienced even under today's improved and carefully controlled sponge making methods. In order to control the purity of regular titanium as well as the alloys careful tests and segregation are employed by Republic on all incoming sponge in an effort to

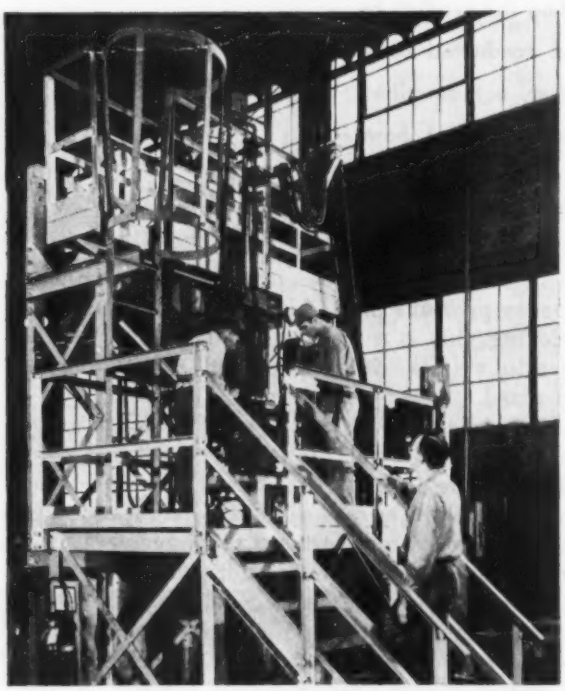

FIG. 1—Republic's single electrode arc furnace for melting titanium sponge located at Canton, Ohio.

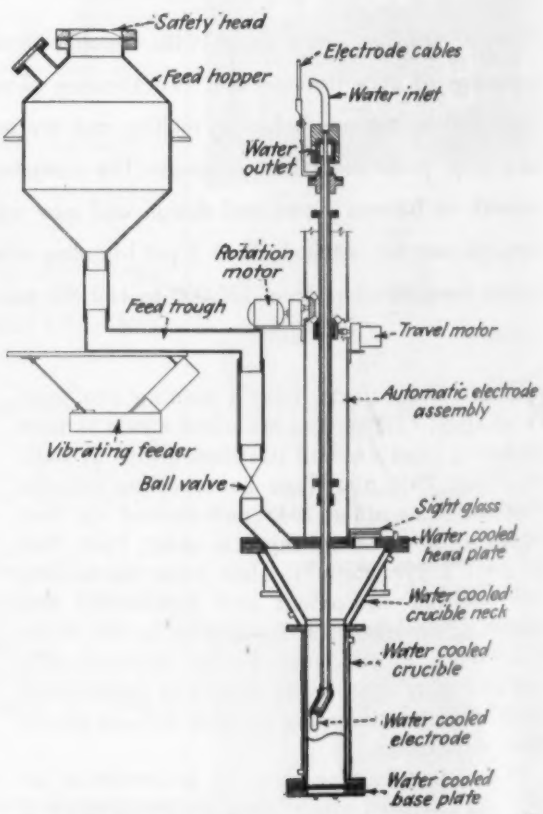

FIG. 2—Schematic drawing of the single titanium arc melting furnace, shown in Fig. 1.

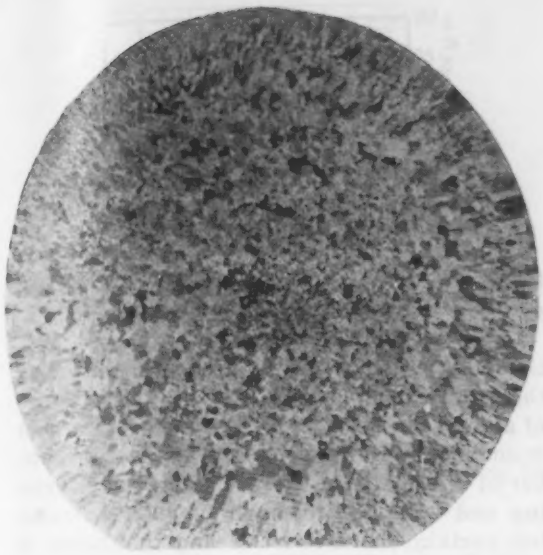

FIG. 3—Cross section of an arc melted alloy ingot showing typical as cast structure of 6 in. diam. ingot.

produce titanium and titanium alloys of the highest and most uniform quality possible.

Ingot and finished product quality as determined by specially designed testing procedudes form the basis for sponge classification..

Alloying in the arc furnace is accomplished by adding alloy powder continuously with the sponge in the proper proportion. Uniformity of alloy in the arc melted product is good but open to considerable improvement. New developments are and will continue to improve the arc melted ingot's homogeneity. A schematic cross section of an arc furnace installed at Canton, Ohio, is shown in Fig. 2. This furnace is unique as to flexibility, ease of operation, and consistent production rates. Many improvements have already been made over the original design and more are planned. Additional furnaces of greatly improved design are in the process of construction. These additional facilities will substantially increase production potential and assure greater overall product quality.

Ingots produced by either arc or induction methods of melting are skinned to a depth of about ⅛ stet prior to forging to remove the somewhat irregular skin. Complete chemistry is run at regular intervals on the ingot and various other quality control checks are made such as etch tests, Fig. 3.

The cleaned ingot is either press or hammer forged depending on size at temperatures depending on composition. Pure induction melted titanium and arc melted alloys are forged about 1750°F. While some surface contamination occurs with prolonged heating above about 1200°F, titanium may safely be forged up to about 1850°F if necessary for higher alloys. The heating time is relatively short, 1 hr per in. of cross section, and further processing should

TABLE I

NOMINAL COMPOSITION OF REPUBLIC TITANIUM

Pct

	Fe	Cr	Mn	Ti
R. S. 40 } *	....	....	....	99.5
R. S. 55 } *	....	....	....	99.5
R. S. 70 } *	....	....	....	99.5
R. S. 110	2.00	4.00	....	Bal
R. S. 120	....	....	7.00	Bal

* Three grades of commercial purity titanium made from these grades of sponge which is segregated according to impurities. R. S. 40 is the most pure hence the most ductile.

TABLE II

MECHANICAL PROPERTIES AS ROLLED

Grade	Yield Strength 0.2 pct offset		Tensile Strength		Pct Elong.		Hardness
	Min.	Av.	Min.	Av.	Min.	Av.	Av.
R. S. 40	40,000	52,000	60,000	56,000	20	28	R_B90
R. S. 55	50,000	63,000	70,000	74,000	20	25	R_B95
R. S. 70	70,000	75,000	80,000	92,000	18	22	R_B102
R. S. 110	110,000	115,000	120,000	125,000	12	14	RC 29
R. S. 120	120,000	128,000	130,000	140,000	10	13	RC 30

TABLE III

PROPERTIES AFTER HEAT TREATMENT

Grade	0.2 pct Yield psi	Tensile psi	Pct Elongation	Hardness
R. S. 110	110,000–125,000	120,000–155,000	10 to 20	RC 25 to 40
R. S. 120	120,000–160,000	130,000–170,000	7 to 20	RC 28 to 40

TABLE IV

FULL RANGE OF PROPERTIES

Nominal Composition	Yield Strength 0.2 pct offset	Tensile Strength	Pct Elongation
Commercially Pure RS 40	40,000 to 85,000	60,000 to 110,000	20 to 28
6 pct Fe-Cr RS 110*	110,000 to 125,000	120,000 to 155,000	12 to 18
7 pct Mn RS 120	120,000 to 160,000	130,000 to 170,000	10 to 7

* Contains 4.00 pct Cr 2.00 pct Fe.

remove any surface contamination which may occur. In general, however, the lowest forging temperature consistent with good results is the best practice.

The finished forging is grit blasted and any defects removed with a fine wheel. It is then given a short dip in 10 pct HF to reveal any minor flaws which are likewise removed before further processing.

Hot rolling is generally done about 200° below the forging temperature which assures a refined grain. Optimum properties are developed on commercially pure titanium with about ½ hour at 1250°F in any standard annealing furnace followed by air cooling. Pickling is best done in a standard sodium hydrate pickling unit followed by a nitric acid brightening dip. Hot rolled, annealed and pickled sheet has a gray white, dull mat finish.

Commercial, flat rolled sizes are limited gen-

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"Pure titanium appears to have a higher fatigue strength than most metals . . ."

erally to 36 in. x 96 in. in the lighter gages and up to 48 in. wide in the heavier gage sheets and plates. Sheets can be supplied as low as 0.018 in. thick and the maximum plate size is limited only by ingot weight.

Table I shows the composition of three, commercially pure and two alloy grades of titanium which are being supplied by Republic. Minimum as well as average mechanical properties are tabulated in Table II. Commercially pure, R. S. 40 is intended for work in which maximum ductility is required. Fig. 4 compares hot tensile data of annealed 17-7 stainless and R. S. 40 titanium bar stock.

Commercially pure titanium bar stock in the annealed condition has a charpy impact value of about 30 ft lbs. There appears to be a transition temperature for both commercial purity and alloy titanum between about 200 and 300°F as may be noted in Fig. 5.

Grain size plays an important part in impact strength as does direction of rolling. In general, ½ in. plate samples show lower impact values than comparable samples from ⅝ in. round bars, apparently due to the coarser plate grain size which is dependent on total hot reduction from the ingot.

Pure titanium appears to have a higher fatigue strength than most other metals. Values for the ratio unnotched fatigue strength to tensile strength for commercially pure titanium have been reported from 0.45 to higher than 0.80 with 0.60 being probably a fair estimate.

Titanium combines readily with a comparatively large number of other elements including the gases oxygen and nitrogen, to form a series of alloys that is extremely versatile with respect to combination of physical properties. The number of alloys still to be investigated is staggering and will require much time for appraisal but certain characteristics and limitations of alloys systems seem to be obvious from the rather intensive work already done. The total alloy content, for example, will probably not exceed about 15 pct and most of the high strength alloys will probably contain between 4 and 10 pct total alloy. Physical properties for titanium and titanium alloys in the immediate future will probably be confined to a range of from 40,000 to 160,000 psi yield, 50,000 to slightly over 170,000 psi tensile, and elongations between 30 pct and about 6 pct.

Republic is making two basic alloy types. They are the 6 pct Fe Cr and the 7 Mn alloys. Both grades are supplied in sheets, plates, ingots, forgings, and bar. Some variation in physical properties may be expected from 1 in. plate, for example, to 11 gage sheet due to primary processing but, in general, the two alloys pre-

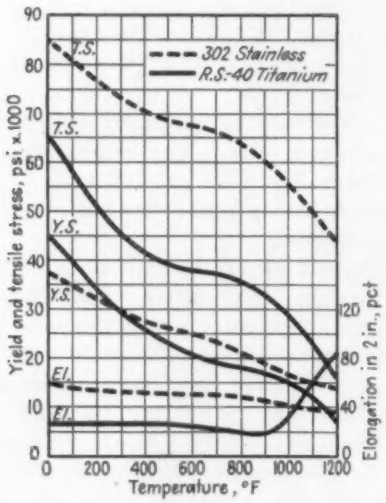


FIG. 4—Hot tensile test curves comparing R. S. 40 titanium and annealed 17-7 stainless.

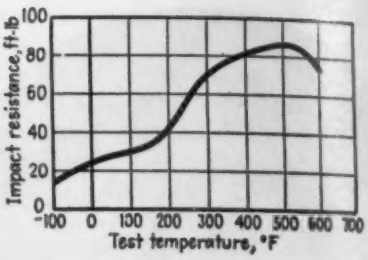
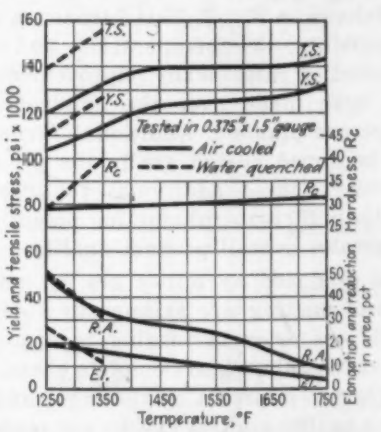


FIG. 5—Charpy V-notch impact values for R. S. 55, commercially pure annealed bar stock.



1250°F—WQ
60 pct α—40 pct β

1350°F—WQ
20 pct α—80 pct β

1450°F—WQ
5 pct α—95 pct β

FIG. 6—Physical properties obtained by heat treating R. S. 110 Fe Cr alloy. Typical microstructures resulting from quenching at indicated temperatures are included.

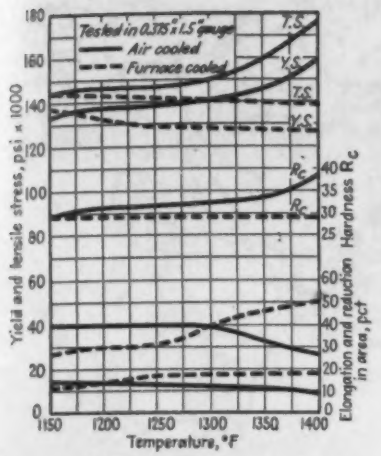


FIG. 7—Physical properties obtained by heat treating the R. S. 120 7 pct Mn alloy.

sent a selection of physical properties by heat treatment as indicated in Table III and Fig. 6 and Fig. 7.

These basic alloys can be modified to give further variations in properties so that an extremely wide range of physical properties is obtainable as indicated by Table IV.

Impact values for both R. S. 110 and R. S. 120 alloys are sensitive to grain size, grain uniformity and direction of rolling. In general both impact curves follow the same pattern with a transition range between 200 to 300°F. This phenomenon was previously noted on commercially pure titanium. Impact values have been obtained on both ½ in. plate and ⅝ in. round bars. In all cases the bar impact values were higher than the ½ in. plate values. Fig. 8 shows impact values plotted against temperature for R. S. 110 alloy.

Both the 6 pct Fe Cr and the 7 pct Mn alloy show pronounced hardening effects if fast cooled from above about 1000°F and reheated to between 500 to 800°F. Extreme brittleness is associated with this hardening and should be avoided. Air cooling an alloy sheet for example from a 1250°F anneal and reheating at 700°F will severely embrittle the sheet. Slow cooling from the 1250°F annealing temperature will eliminate any subsequent brittleness due to reheating and will recover ductility previously lost by rapid cooling and reheat. This slow cooling cycle is referred to as a stabalizing anneal

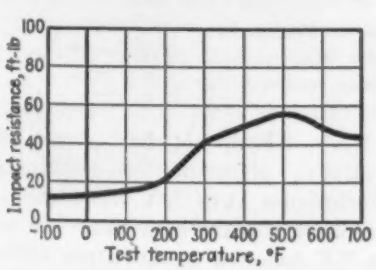


FIG. 8—Charpy V-notch impact values plotted versus temperature for R. S. 120 alloy.

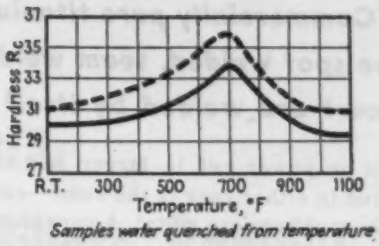


FIG. 9—Effect of reheating on the hardness on two heats of the 6 pct Fe Cr alloy. These samples were rapidly cooled from 1250°F and reheated to temperatures shown.

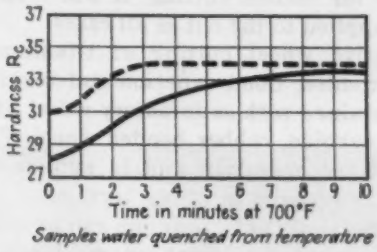


FIG. 10—Effect of time at 700°F a hardness on two heats of R. S. 110 alloy. The maximum hardness is reached after 3 to 8 min at temperature.

treatment. Figs. 9 and 10 show this effect graphically on two R. S. 110 heats.

Compared to 18-8 stainless steel, ductility of titanium is only fair. It is roughly comparable to that of type 430 stainless. Commercially pure titanium can be expected to give a 180° bend over a radius of 2T. For particularly difficult forming jobs it may be necessary to employ hot forming techniques. The temperature depends largely on the particular job but for commercially pure titanium 400-500°F is recommended. Severe working of alloy titanium has been done quite successfully at temperatures between 900 to 1000°F.

Titanium is very susceptible to cold work and reacts much the same as 18-8 stainless to machining. All of the common machining operations may be performed once the feel has been obtained. Probably the most important single factor regardless of operation, tool type or other variable is to keep cutting without tearing or dragging. Titanium has a pronounced tendency to seize or load in confined spaces and for any operation the equipment should be heavy enough to prevent play and take strong, positive cuts.

For continuous heavy cuts where the tool is not subject to impact a carbide tool will give best performance with long life. Other operations, involving the starting of new cuts or cutting an irregular surface where the tool is not in contact with the work, requires high speed tool steel. Tool life in this case is not too good. Optimum results are obtained with very slow speeds and heavy feed rates. CO_2 has been successfully used as a coolant on certain titanium alloys (see THE IRON AGE, April 17, 1952, p. 107, "How To Machine Titanium").

Titanium may be hack sawed by hand in small

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"Commercially pure titanium can be spot welded, seam welded, or inert arc welded by itself . . ."

sections or power cut in larger sections. The technique in either case is the same—each power stroke must remove metal. A very slow stroke with heavy pressure is recommended.

Saw blades must be kept sharp. High speed blades with 2 to 4 teeth per in. are most satisfactory for section cutting. A water base coolant is applied to the cut in all cases.

Abrasive wheel cutting of titanium shows good promise. Good experimental results have been obtained with satisfactory wheel life using silicon carbide, rubber bonded wheel. This is a wet cutting operation and is applicable with proper equipment to heavy sections.

Commercially pure titanium can be spot welded, seam welded or inert arc welded by itself. The welded tubing in Fig. 11 is an excellent example of inert arc weld. Unlike most other metals it is important to keep both sides of the weld blanketed with inert gas to prevent atmospheric contamination. The narrowest possible weld effected zone should be maintained and the weld should be allowed to cool as rapidly as possible.

Special techniques are required at present to successfully braze titanium. Experimentally, titanium has been brazed to itself and to other metals. A special fluoride flux and slight modification of standard technique are necessary for titanium brazing. Good results have been obtained using "Special Titanium Flux No. 110" which is made by Handy and Harman. This flux has a fluid point of about 1185°F and good

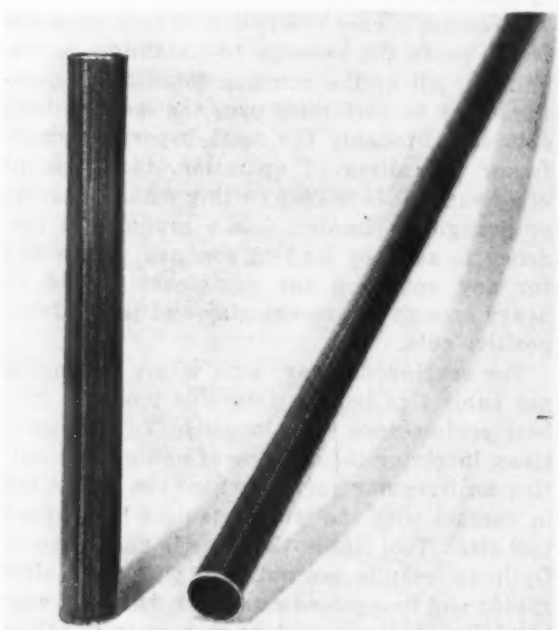


FIG. 11—Sections of 16 gage commercial purity titanium tubing as welded under complete inert atmosphere protection.

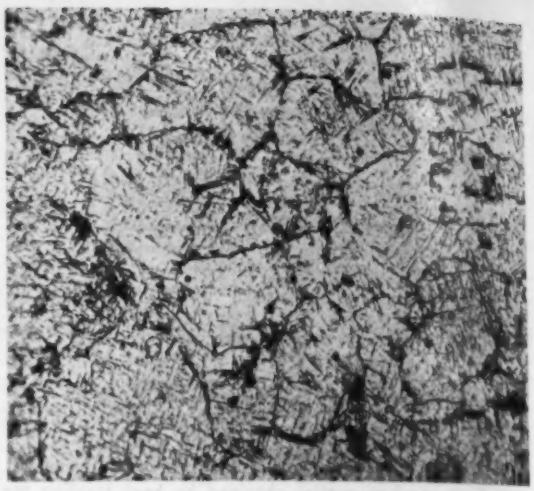


FIG. 12—Microstructure showing acicular alpha structure. The sample was etched in 2 pct HF followed by a 50 pct H_2NO_3 rinse. Mag, 500x.

joints can be made with most types of brazing rod. Standard brazing practice is recommended with an oxyacetylene torch which is slightly carburizing. Furnace brazing methods with inert gas atmospheres appears promising. As with stainless, the joints should be brazed as soon as possible after cleaning. The flux should be generally applied and should extend well beyond the joint area.

Titanium metal in its purest form exhibits an allotropic transformation at 1615°F. This transformation which may vary up or down with purity, produces a number of different structures depending upon the alloy composition and cooling rates.

Alpha titanium, the hexagonal close packed system, is the low temperature phase. It occurs as equiaxed polyhedral grains in the annnealed condition and is difficult to differentiate from the body centered cubic or beta phase which is the high temperature phase and which normally exists only at elevated temperatures.

In the higher alloys, such as 15 to 20 pct Cr, 100 pct beta can be retained at room temperature with air cooling. The 5 pct Fe Cr alloys will retain substantial amounts of beta at room temperature with water quenching from above the alpha-beta transformation temperature.

Polarized light is helpful in differentiating between alpha and beta titanium. Alpha grains become alternately light and dark when illuminated with plane polarized light and rotated about the optical axis of the microscope. The beta phase remains dark.

Microetching is done with concentrations of HF or HNO_3-HF up to about 5 pct in either water, alcohol, glycerine, or combinations of same. Techniques vary but HF alone tends to darken alpha and leave beta clear—15 to 30 sec in 2 pct HF followed by a 50 pct HNO_3 rinse will produce a good all purpose, metallographic etch as shown in Fig. 12.

Combination Tool Centers, Spotfaces Bronze Billets Rapidly

A combination tool which permits spotfacing and centering of 13 in. long x 1 to 3½ in. diam bronze billets in one operation has been developed by tool engineers at Federal-Mogul Corp., Detroit.

Maximum tool life and cutting efficiency have been achieved in this tool by using a standard STB-48B Carboloy grade 883 tungsten carbide tip for the spotfacing operation, and a high speed steel standard center drill for centering.

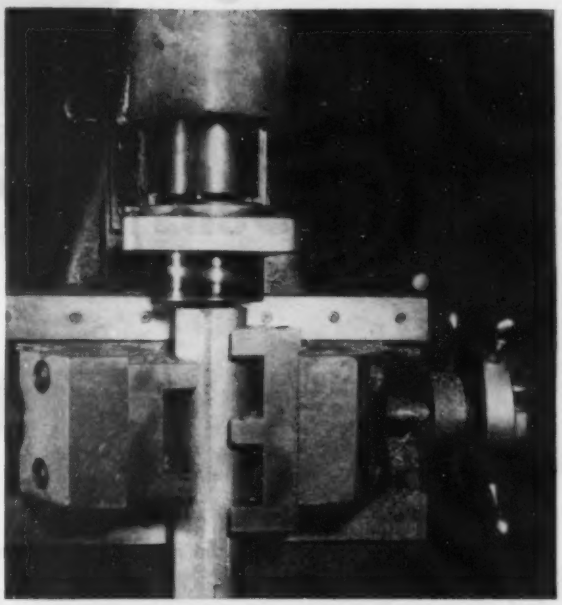
The tungsten carbide is brazed to a steel insert and clamped in the taper shank tool holder with set screws.

Use of the carbide insert permits the entire operation to be performed at higher spindle speeds. The steel portion of the tool does its cutting only at the center, where surface speed is low. The balance of the cutting portion of the tool, operating at progressively higher surface speed from the center out, is carbide.

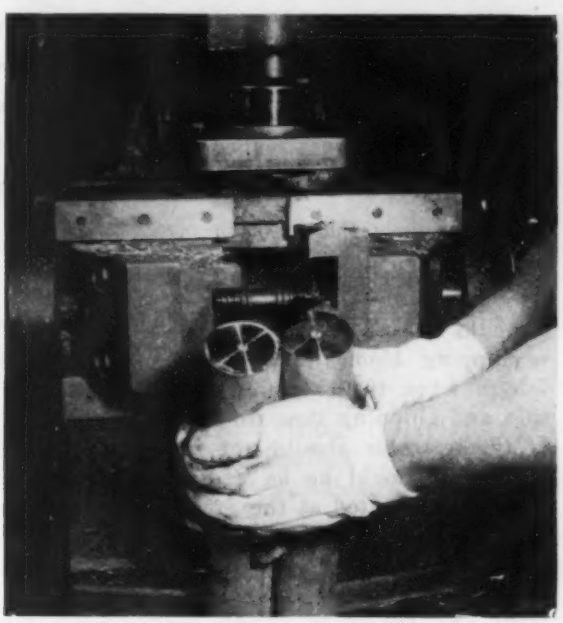
Billets are clamped in a fixture on a single spindle drill press. Spindle speed is 376 rpm. No coolant is used in cutting. Both ends of the billet are centered and spotfaced.

The combination tool was originally designed to use three tungsten carbide-tipped inserts for spotfacing. In use, it was found that one carbide insert gives better surface finish and lasts longer.

COMBINATION SPOTFACING and centering tool with Carboloy tungsten carbide tipped spotfacing insert tool and high speed steel standard center drill.



CLOSEUP of clamping fixture with bronze billet in position during the cutting operation.



TWO BRONZE BILLETS with ends spotfaced and centered.

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Less chipping and more tonnage—

Right Approach Sells INCENTIVE PAY CHANGE

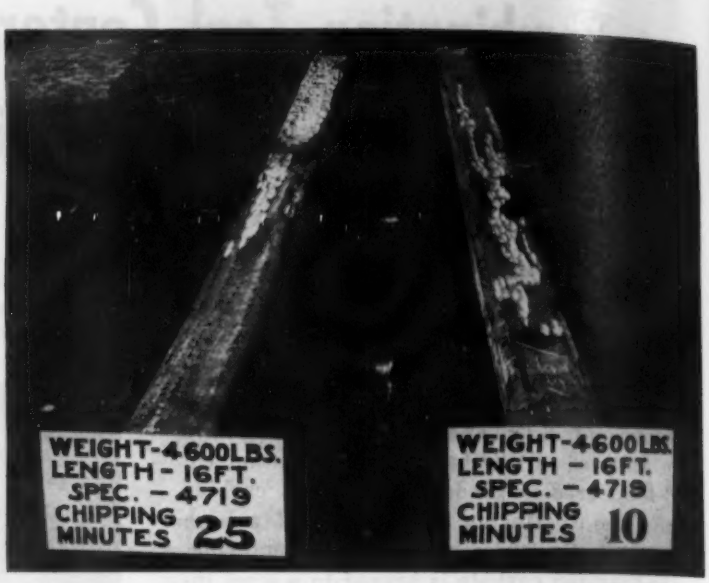

FIG. 1—Should operator receive same pay for chipping each bloom? Steel & Tube Div. of Timken Roller Bearing used a novel method of selling an incentive pay change.

How to present a change in the method of figuring incentive pay—and in a manner acceptable to both management and operators—is a common problem. Steel and Tube Div. of Timken Roller Bearing Co. neatly solved such a problem at a group meeting using slides and commentary. Chipping operators had been receiving similar pay for chipping blooms regardless of chipping time involved. Existing pay was an incentive for tonnage chipped only. A new method, based on weight, number of pieces, and amount of chipping required was successfully sold to both management and operators.

By Tarzan Monda
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Steel & Tube Div.
Timken Roller Bearing Co.
Canton, Ohio

Should an operator receive the same pay for chipping blooms of the same weight and length when the chipping time for one is 25 min and chipping time for the other 10 min? If the operator should not receive the same pay, how should he be paid? This was the problem presented at the Steel and Tube Div. of Timken Roller Bearing Co.

It was desired to present the problem and soluton in a manner receptive to both management and operators. Slides and a projector permitted the commentator to command the attention of everyone and the group was able to see, and read the theory of wage payment on the chipping machines.

The introductory slide stated that a man was to be paid for the work he does. Since the work requirement differs each day, the proposed plan attempted to gear pay directly to work. In other words, increased production—increased pay.

Time values and flow of material were considered and methods of figuring pay were discussed. The problem was solved by going over

FIGURING PAY

PAY IS BASED ON:

1. PIECES
2. WEIGHT
3. CHIPPING MINUTES

$$\text{Performance} = \frac{\text{Time allowed to do the Job}}{\text{Time taken to do the Job}}$$

Time Taken 50 Minutes	Incentive Pay 10 Minutes

Time Allowed 60 Minutes

CHIPPING OPERATOR'S PAY

30 pieces × standard = 75 min earned
70 tons × standard = 100 min earned
250 chipping minutes × standard = 300 min earned

Total min earned			475
Min to do the job			415
Bonus Minutes Earned			60
BASE PAY Base Rate × Hours Worked X	×	8	= 8X
PLUS INCENTIVE PAY X	×	1 hr	= 1X
		Total Pay	9X

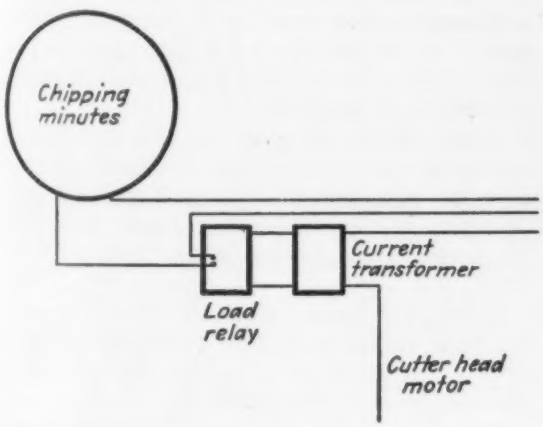

FIG. 2—Mechanical cog in figuring incentive pay is the accumulating time recorder attached to cutter head motor.

FIG. 3—Chipping head goes to work on bloom. Methods of handling materials were also demonstrated.

FIG. 4—Workmen inspect and mark blooms on mill floor.

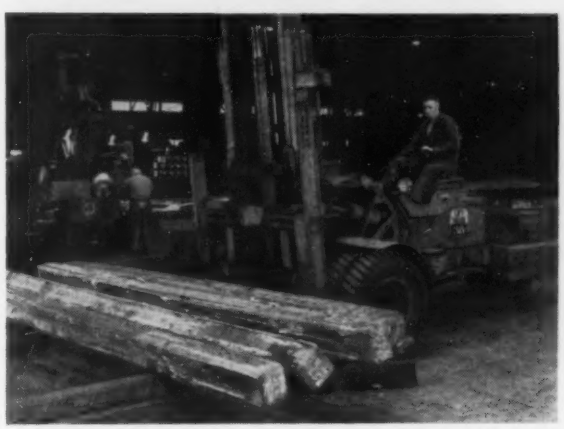

FIG. 5—Lifter, used to pick up blooms, speeds handling to and from chipping machine.

the shortcomings of the present plan which did not reflect the amount of work done by the operator. He was paid only for product pushed through the machine, regardless of work time involved.

Payment under the present wage plan is incentive for tonnage chipped only. The proposed wage plan would pay incentive in proportion to the amount of work performed by considering: (1) Weight; (2) pieces; (3) amount of chipping required.

To assure operators of the soundness of the incentive, basic assumptions used in establishing the time values were presented. In explaining the time values, an operator can readily see where each function he performs has some effect on his pay. Since measured work will reflect increased skill and effort, each

"By translating production into time, the final formula for wage payment is established . . ."

man should know the individual factors that can affect his bonus.

Time values for work required to perform the job on the chipping machines follows. Per piece pay is broken into the work required to (1) charge the machine; (2) discharge machine; (2) turn bloom. Weight pay is the time needed to move the cutter head between chipped areas.

As seen in the two blooms, Fig. 1, with a different amount of surface removed, each piece presents a different condition. The final phase of time values is "chipping minutes," Fig. 2, which was taken into consideration under the plan.

By placing proper weight on chipping, Fig. 3, an approach to "amount of chipping required" may be attained. The plan was not designed to encourage a man to chip more than is necessary. But still he must chip sufficiently so he doesn't have to rework the product. The plan for machine chipping also involved a method change. The new method of handling material was explained pictorially so other departments could change their procedures to conform with the new method. Figs. 4 and 5 show operations necessary to maintain material flow.

Next part of the presentation was figuring pay, since pay is based directly on pieces, weight and chipping time. Factors which are changed from product produced, to money received for production are shown in the box.

It was further explained that incentive pay could be earned by producing pieces, weight or chipping minutes in less time than was allowed to produce them. By translating production into time, the final formula for wage payment is established.

A typical example of how chipping operator's pay is figured is shown in the table. By considering pieces, weight and chipping time, a constant incentive was created for the operator, enabling him to earn additional wages providing he puts forth the extra effort.

Delivered Ammonia Costs Less

A new, keep-fill by truck ammonia service is saving money for heat treaters in the midwest and is also simplifying the problem of handling ammonia.

The use of anhydrous ammonia in prepared atmospheres for heat treating processes often presents a difficult materials handling problem to management. A large number of heat treat plants do not have a rail siding for tank car delivery. Many plants having railroad sidings find their volume requirements do not justify the costly installation of necessary pumps, evaporator and storage tanks.

Until recently, the only alternative was to order anhydrous ammonia in cylinders. Two types of cylinder are commonly employed: (1) the standard type 150-lb capacity is 7 ft long and 12 in. diam. Weight is about 230 lb. (2) the bottle type is about 53 in. high and 15 in. diam. Weight is about 190 lb.

Handling ammonia delivered in these large, bulky cylinders is both awkward and costly. Storage space must be provided for both full and empty cylinders not in use as well as cylinders in actual service. A constant check on ammonia supply must be made and cylinders must be changed frequently.

Hamler Industries has found a satisfactory answer to this problem for Commonwealth Industries, Inc., Detroit, by providing a keep-fill by truck service which completely eliminates the necessity for having bulky cylinders in the plant.

Briefly, the Hamler plan provides: (1) A storage tank equipped with an evaporator. This is owned and maintained by the vendor; (2) A keep-fill service by tank truck.

This service gives the heat treat plant a constant supply of ammonia with as little trouble as the user encounters with gas or water utilities.

Cost per lb of anhydrous ammonia purchased from a tank truck is about half the cost of gas bought in cylinders. No labor is required for handling as in the use of cylinder gas.

Commonwealth Industries has been using this tank truck ammonia supply for more than a year and reports entirely satisfatcory service. Recently, other Detroit heat treat plants have changed over to this keep-fill, low cost ammonia service for their heat treat department.

Avoid leaky tube rejects—

Heat Exchangers REQUIRE PRECISE FABRICATION

By F. A. Guba
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Good tube expanding practice is vital in manufacture of heat exchangers. And heat exchangers are vital components of a wide variety of equipment and processes. Successful tube expanding depends on five basic factors: tube characteristics, tube sheet characteristics, tube and tube sheet preparation, workmanship, and physical properties of steel used. Tubes should have uniform dimensions and physicals throughout length. Tube sheet holes must meet tolerances. Rolling-in should use controlled torque. Steel with low yield point is desirable.

It is estimated that 90 pct of all expanding operations of tube walls is into tube sheets for the manufacture of heat exchangers, condensers and evaporators. Because these items are being made in increasing supply to take care of defense program requirements, it is desirable to minimize rejects. Close attention to the factors which affect the successful rolling of tubes into tube sheets must be paid.

In order to expand tubing evenly and uniformly so that contact with the tube wall and tube sheet hole is 100 pct effective, five factors should be considered: Quality and characteristics of the tube; quality and characteristics of the tube sheets; preparation of both tube and sheet; quality of workmanship; and physical properties of various analyses of steel.

It is essential that the tube have uniform dimensions, and that this uniformity extend through the entire length. Only under these conditions can each tube be rolled into the tube sheet with equal amount of expansion and uniform pressure in the tube sheet hole. Uniformity is also necessary to the proper rolling into double tube sheets as in some U tube exchangers. This property likewise simplified the drilling of tube sheets to predetermined size to allow for clearance and tolerance of tube in the tube sheet.

Table I gives the allowances recommended by the Tubular Exchanger Manufacturers' Assn. for best results. The actual amount of expansion varies somewhat, depending on the permissible variation of the tube OD. But if the tubes are of proper heat exchanger quality, fully annealed, the amount of cold working necessary to expand the tube into the hole will produce less workhardening of the tube than the cold work required to seat the tube tightly into the tube sheet.

The OD should be smooth and clean to seat smoothly and continuously without air spaces between the tube and the tube sheet hole. Air spaces, by joining together, frequently are the cause of leakage and ultimate failure. The ID of the tube should be smooth and clean to allow uninterrupted flow of material and eliminate rolling of foreign material into the tube wall.

The steel should be full AISI analysis for complete corrosion resistance, and should not be varied to assist in either manufacture or fabrication. Regular AISI analyses of stainless steels, when carefully annealed, present a material readily rolled or expanded into tube sheets. If not properly annealed, workhardening rate is greatly accelerated, causing over-rolling of the metal before it is actually seated in the tube sheet hole. Under these conditions, when the tube is finally expanded, it will tend to spring away from the tube sheet. When this happens, nothing short of drift pin will tighten the tube

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"Uniformity of tube walls and machinability of the tube sheet are important . . ."

uniformly as this will expand the entire circumference at once. However, it is not desirable to be forced to use such remedial measures.

If walls are uniform around the entire circumference of the tube, even expansion into the tube sheet hole eliminates any uneven work-hardening. Uniform walls also prevent the tube from expanding more on one side than the other, and insure even pressure of the tube wall around the entire surface of the tube sheet hole.

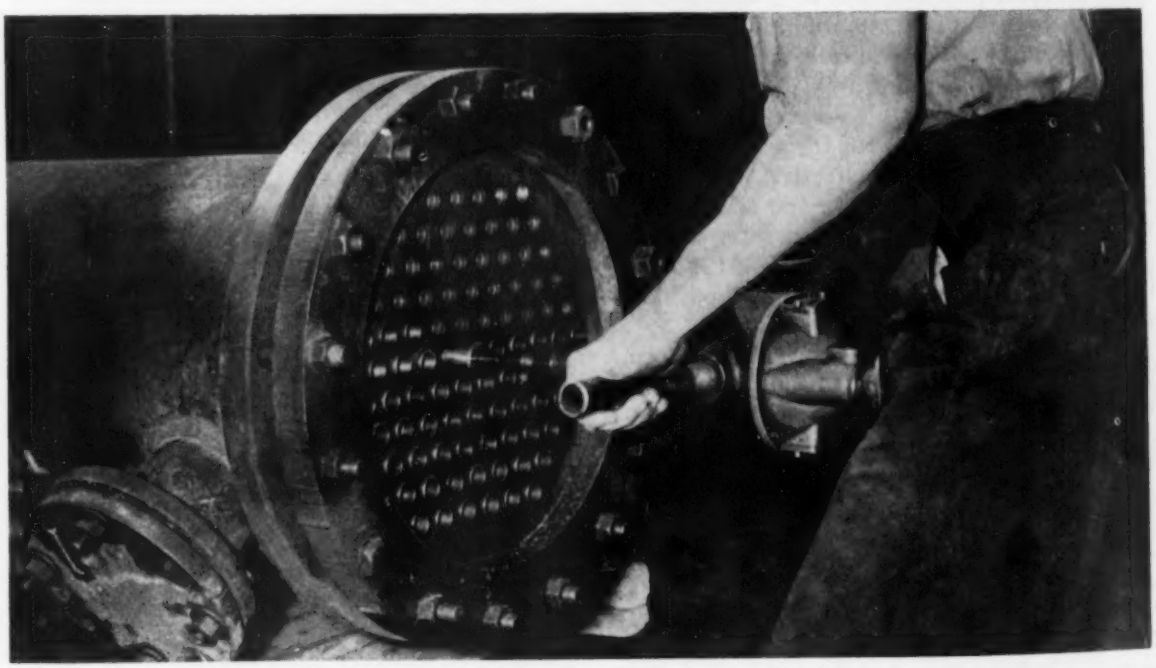
Heat exchanger tubing requires top quality in manufacture in order to produce top quality in fabrication. When made from smooth surfaced, cold-rolled strip, the finished tube continues to bear the same smooth surface necessary to insure complete surface contact between tube and tube sheet. Uniform thickness of the cold-rolled stainless strip assures uniform tube walls. When walls are uniform throughout the entire length of the tube, the fabricator can cut the tubing at any place and roll it successfully into the tube sheet without any end preparation other than deburring. The entire tube should be of the same analysis. The tubing should be welded by shielded arc methods and eliminate the addition of welding rod. Uniform analysis permits even expansion in the tube sheet hole and eliminates hard spots.

Properly manufactured heat exchanger quality welded tubing provides these time-saving and quality-producing advantages. Because of its uniformity, this tubing may be purchased and cut to length from distributors' stocks, thus eliminating long waits for mill shipments in case of an unusual breakdown. Also, the uniformity of the tubes enables users to have their tube sheets drilled ready for rolling tube on arrival.

Machinability of the tube sheet is important from a production standpoint. Aside from the analysis and machinability of the tube sheet, hardness of the tube sheet bears a definite relation to the ease of rolling the tube. It is considered good practice to have the tube sheet a few points harder than the tube in order to give a solid backing against which the tube can be expanded. However, many times stainless steel tubes have successfully replaced tubes of other alloys and have been successfully rolled into the original tube sheets of lesser hardness. This requires carefully annealed tubes and controlled rolling methods.

In preparation of tube and tube sheet, it is important to select tubes with finish and tolerances which will insure good rolling. The next step is to deburr and smooth ends of tube, and remove all scale. Unless the ends are smooth and clean, difficulty will be experienced in insertion and rotation of the roller. The third step is to drill tube sheet holes and ream to special sizes required. The sheet should be drilled to the proper size, plus such tolerances as are recommended by the Tubular Exchange Manufacturers' Assn. with the proper number and size grooves for the pressures and applications involved. Recommended tolerances are shown in Table II.

The holes should be drilled cleanly, free of any burrs, chips, or foreign matter. It is always



A ROLLING-IN heat exchanger tube. Expander motors may be fitted with torque meters, or if electric, with current limiting devices, to get good rolling job through controlled torque.

TABLE I

TUBE FIT ALLOWANCES

Nominal Tube OD in.	Standard Tube OD Tolerance in.	Nominal Tube Sheet Hole Clearances in.	Special Close Fit in.
0.250	±0.003	0.006	0.004
0.375	±0.003	0.008	0.004
0.500	±0.004	0.008	0.004
0.625	±0.004	0.008	0.004
0.750	±0.004	0.010	0.005
1.000	±0.005	0.010	0.006
1.250	±0.005	0.015	0.008
1.500	±0.005	0.018	0.009

TABLE II

TUBE SHEET HOLE DIAMETERS

Nominal Tube OD in.	Nominal Tube Hole Diameter		Tube Hole Tolerance in.
	Standard Fit in.	Close Fit in.	
0.250	0.256	0.254	±0.002
0.375	0.383	0.379	±0.002
0.500	0.506	0.504	±0.002
0.675	0.633	0.629	±0.002
0.750	0.760	0.755	±0.002
1.000	1.010	1.006	±0.002
1.250	1.265	1.258	±0.002
1.500	1.518	1.509	±0.003

best if the tubes are flush with the face of the tube sheet so as to eliminate any pockets where corrosive materials can lodge. The holes do not necessarily have to be drilled to consider tube ovality, since that is included in the total tube tolerance. The spacing of holes in the sheet has been engineered and approved by the TEMA and is adequate for proper rolling of ductile material. Where triangular pitch is desirable, a minimum of 1.25 times the OD of the tube is recommended as the center-to-center of tube holes. Where square pitch is specified, a minimum of ¼-in. ligament is required.

Spring back is critical

The amount of rolling which a tube should have is quite controversial, but it is agreed that it must be rolled sufficiently to maintain a tight fit against the tube sheet hole, yet not over-rolled so that the tube wall becomes hard and springs away from the tube sheet.

The proper amount of rolling depends to a great extent on the tolerance which has been allowed between tube and tube sheet hole. Since less workhardening takes place during the expansion up to the point of metal-to-metal contact, most of the control of work hardening takes place beyond this point.

By use of controlled torque methods, the amount of rolling can be determined to roll the tube about 0.001 to 0.003 in. beyond metal-to-metal contact. This has been found to be sufficient to seat the tube in the grooves, and if properly annealed tubes have been used, will eliminate over-rolling into the tube sheets. Extreme care should be exercised so that the tube will contact the tube sheet hole throughout the entire thickness of the tube sheets. Any spaces or voids between tube and tube sheet can cause corrosive action to take place.

In the past most rolling-in of tubes into tube sheets was accomplished by the use of an air motor or electric motor fitted to the end of a tube expander. This is still in effect in many plants. Most operators depended either on the resistance which they had to apply to keep the motor from turning in their hands or by the sound of the motor to tell them when the tube was sufficiently rolled into the tube sheet. It is not surprising, therefore, that to a tired operator 10 in.-lb of pressure at the end of the day would seem heavier than 25 in.-lb at the start of the day and would be the cause of many under-rolled tubes or leakers.

With the newer methods of torque control, where neither sound nor brawn plays a part, a more scientific control is had. One method is controlled by using a wrench with a meter showing the number of inch-pounds of torque expended. This, of course, means constant vigilance to see that the meter does not go beyond the prescribed pressure required for full contact. Frequently it was necessary for the operator to stop the rotation of the expander to read the meter. This is not the best method of rolling-in since the tube should be steadily expanded to the proper amount without stoppage.

A better method seems to be one using equipment which measures the input of current to the driving motor, which has been previously determined for the size tube to be rolled. When this current has been used there is no further possibility of expansion to cause over-rolling. To determine the proper setting a sample piece of tube is rolled into a sample piece of plate and wall thickness measured. This shows how much current has been necessary to roll the prescribed amount beyond metal-to-metal contact. The machine is then set for this input of current beyond which the motor can not operate.

Kerosene lubricates and cleans

The expander is usually dipped into either kerosene or very light oil thinned kerosene, which both cools and lubricates the parts during the rolling operation. It also tends to wash off the roller particles of steel or other matter which it may have collected from the tube.

Usually the operator uses two rolling-in tools, leaving one in the lubricant to cool while rolling with the other, alternating after each tube.

The expanding properties of tubes can be directly proportional to the tensile properties. For example, a tube with a low yield point will expand with less workhardening than a tube with a much higher yield point, since the amount of workhardening on the tube with the lower yield point will not cause the yield point to approach the ultimate as closely as one that starts with a higher yield point.

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Grinders for high stock removal—

ABRASIVE BELTS

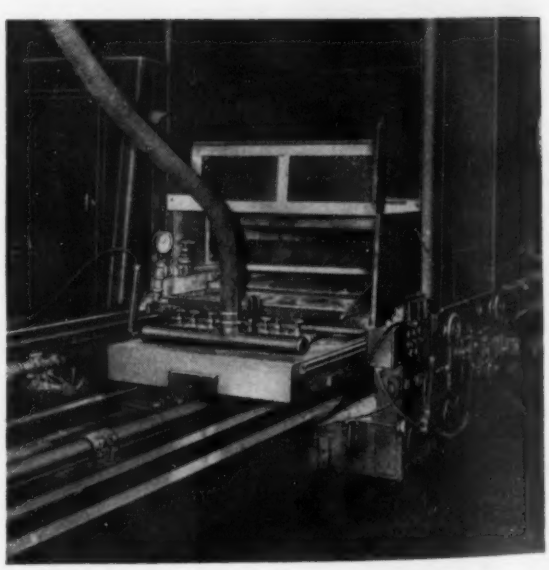
Taper Aluminum Plate

A huge abrasive belt machine has been developed for putting the taper and finish on aluminum plate for aircraft wings. The job is now done primarily by milling. Machine can remove as much as 0.01 in. of stock in one pass, over entire width of plates 72 in. wide. Roughing and finishing can be done in same machine. Advantages claimed are fast stock removal, low operating cost, low initial investment, quick delivery of machines and belts.

About 6 months ago the executives of the Coated Products Div. of The Carborundum Co. at Niagara Falls, N. Y., came up with a new idea for tapering aircraft skin. Why not remove the metal and get the desired finish with abrasive belt grinding? Their neighbors, Bell Aircraft Corp., in Buffalo, were receptive. So was the Air Force. Carborundum got a contract, and a standard Hill-Acme stainless steel sheet grinding machine was converted to do the job.

The result was a new high speed process with low operating costs and relatively low initial investment. It turns out a high quality product, on a machine which can be delivered in 6 to 8 months. This figure includes engineering of the first production machine.

The process uses a wide-belt machine with a rubber-faced contact roll. The Carborundum Type 61 wheel is used to back up the belt at point of contact with the work. This is a serrated-surface, rubber-coated roll. Cuts up to 0.01 in. in depth can be taken over the entire width of aluminum sheets up to 72 in. wide. The



MODIFIED wide-belt abrasive machine used in finishing aircraft skins. Abrasive belt has been removed to show the serrated rubber covered roll used to back up the belt.

process advantages are fast production, low operating cost, low investment, quick delivery of machines and belts, and high quality.

Fast production is obtained primarily by rapid stock removal. The main reason for this is the fact that a large area of the sheet is being worked on at one time. On one typical single taper operation, floor-to-floor time on a 250-hp machine now being developed would be 15 min. The same operation performed by conventional milling equipment would take about 2½ hr.

Another contribution to fast production is the fact that roughing and finishing can be done on the same machine in the same setup. All that is required is change to a finer-grit belt, which takes about 40 sec.

Chucking is faster. Because there is no vibration from cutter action, no bolting down is required to aid the vacuum chuck in holding the workpiece. This speeds up loading and unloading, and thus speeds production.

Operating costs are low because highly skilled labor is not required. A man can learn to use the abrasive machine in 2 days. Overall manpower requirements are lower than for milling because of the elimination of the need for bolting down. There is no cutting tool maintenance since the relatively inexpensive belts are discarded when worn.

No hand finishing is required. Due to elimination of bolt holes around the edges of the part, no trimming after tapering is required. Grinding dust, like chips, is salvageable.

Capital investment for machines now being designed to handle entire aircraft wing panels is expected to be on the order of $100,000 to $150,000. Delivery of the first machine, including initial engineering work, can be made in 6 to 8 months. Delivery times for subsequent machines would not exceed 8 weeks.

CLOSEUP of modified wide-belt abrasive machine used on aircraft wings. Aluminum plate is shown in position to pass under contact roll over which abrasive belt passes.

Any desired degree of surface finish can be obtained, with accuracy to within 0.005 in. Surface finishes of 10 rms have been achieved. If necessary, accuracy can be within 0.002 in. The process does not alter the metallurgical properties of the aluminum. In fact metal surface temperature during grinding does not exceed 90°F. This reduces or eliminates warpage, distortion, and metallurgical change.

Under test conditions, abrasive costs have been found to be from $0.12 to $0.15 per lb of aluminum removed. This is expected to be lower under production conditions.

NEW BOOKS

"Elementary Metallurgy," by W. T. Frier. Starts from scratch in teaching principles of metallurgy to the beginner. The enlarged second edition provides more detailed information on blast furnace and openhearth reactions and greater stress on the origin of steel and influence of carbon. McGraw Hill Book Co., 330 West 42nd St., New York 36, N. Y. $4.50. 258 p.

"Is Anybody Listening," by William H. Whyte, Jr. More than 2 years of research went into this study of American business and how it communicates with itself, other business, and the public. The study turned up a lot of gobbledeygook and showed much wasted effort. Some searching questions are raised. Are we ducking ugly problems of moral choice? Does our new system of group participation threaten a new and dismal social conformity? Simon & Schuster, Inc., 630 Fifth Ave., New York 20. $3.00. 240 p.

"Handbook of Engineering Fundamentals," by O. W. Eshbach. Second edition of a reference book on all phases of engineering. Discussions on mathematics, thermodynamics and fluid mechanics entirely revised. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. $10.00. 1324 p.

"An Outline of Metallurgical Practice," by Carle R. Hayward. This second edition brings up to date a reference text on metallurgical practice from mine to finished product. Brief chapters on titanium and uranium have been included. D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 3. $10.00.

"Imperfections in Nearly Perfect Crystals." A summary of the symposium of the subject of lattice imperfections. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. $7.50. 490 p.

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Tarred ladle nozzles improve ingot pouring

To obtain better ingot pouring practice, the melting department of the Steel and Tube Div. of the Timken Roller Bearing Co. now uses tarred or carbonized ladle nozzles for all types of steel produced. This practice was adopted after considerable development work, instigated by remarks in an article by J. H. Chesters,* aimed at producing a nozzle satisfactory for the teeming of quality alloy steel.

Properties necessary for a satisfactory bladle nozzle are: (1) A material which will not induce build-up of steel in the bore during the pour. (2) A nozzle which will be semi-plastic at steel pouring temperatures so that the graphite stopper head will seat properly at all times during the pour. This prevents dripping from mold to mold, and metal does not stick to the nozzle. (3) A nozzle must not erode appreciably during use thus lessening the amount of refractory inclusions carried into the ingot. (4) A nozzle must have good mechanical strength both at room temperatures and at steel pouring temperatures to reduce spalling and chipping during handling or during the pour.

Carbonized nozzles which Timken uses are made of medium duty fire clay soaked in hot anhydrous tar. The fire clay which has given best results has a pyrometic cone equivalent in the range of 16 to 20, or a softening temperature range of 2670° to 2780°F. This fire clay ranges from 10 to 15 pct porosity and has an absorption range of 5 to 6 pct. All nozzles have a 6-in. OD with bore sizes of 1 to 3 in.

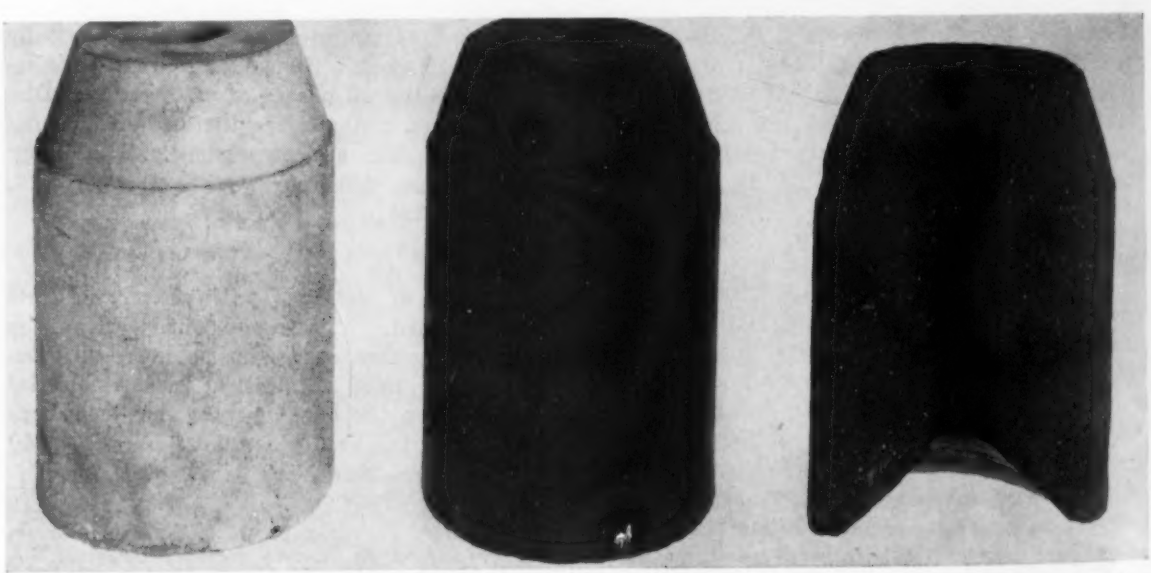
First step in preparation of the carbonized nozzles is to check the seating of the stopper head in the nozzle. If a true seat is not found the nozzle is ground back until the stopper head makes perfect contact. They are then racked and lowered into a tank of heated anhydrous tar. Nozzles are left in this bath, about 230°F. After 48 hr one of the nozzles from the batch is removed and split to determine if the tar has permeated the entire refractory cross section. If penetration is incomplete nozzles remain in the bath until diffusion of the tar into the refractory is complete. Checks are made every 24 hr. Several factors may lengthen the tarring period. Among these are use of tar used for several previous batches and nozzles with a structure denser than that desired.

When thorough penetration has been obtained nozzles are removed from the tar bath and placed in a gas-fired drying oven. Nozzles are held in the oven, 350° to 400°F, for 48 hr. After the nozzles have been dried they are scraped and brushed to remove blistered or flaked tar from the external surfaces and from the bores.

The treated nozzles, first used on heats of high alloy content, met with such success that their use was made standard practice for all types of steel produced.

During teeming a steady stream which can be started or shut off with minimum effort is desirable. There should be no build-up of metal in the bore. A slight erosion of the nozzle during the cast is needed so that a constant stream velocity may be maintained with the decreasing ferro-static head.

To achieve constant pouring rate and avoid accreation in the bore, the nozzle material must erode slightly at pouring temperatures. Softening point must be in the range of pouring temperatures.



BETTER STEELS resulted from use of tarred ladle nozzles at Steel & Tube Div., Timken Roller Bearing Co. First tried experimentally with alloy steels, the nozzles are now being used for pouring of all steels. Left, untreated fine clay nozzle; center, tar impregnated nozzle; right, fractured nozzle showing tar penetration and distribution.

Fascinating fiber—

NEW FIBER FILTERS, INSULATES—

Stands up at 2300°F

Possible uses for a new ceramic refractory fiber are so wide that the potential market can't even be guessed at. One major use will probably be in industrial furnaces where $2 worth of fiber (at pilot plant price) has the insulating value of $2.40 worth of high grade refractory insulating brick. Present or potential uses include: Ceramic paper, expansion joint insulation, filters for smoke and bacteria, etc.

A synthetic refractory fiber recently announced by The Carborundum Co., Niagra Falls, N. Y., has a host of interesting possibilities in the metalworking field. The biggest immediate use is likely to be for furnace and jet engine insulation. In other fields its possibilities are fascinating too; ceramic paper, filters, and insulators are just a few.

Trademarked "Fiberfrax," the new material easily withstands 2300°F without loss of properties, yet it is so fine that it can be used as a superfilter. At present it is being used for high-temperature insulation in combustion and exhaust systems of jet engines; it is under study by the Office of Naval Research for use in highly specialized papers; it can replace or be combined with critical asbestos in many electrical and thermal uses; it can be bonded into insulating panels that will not only resist fire and prevent heat loss, but will also deaden sound. As a filter, "Fiberfrax" fiber can improve the efficiency of gas and fume filtration.

Its inertness permits cleaning and reuse of the material without loss of filtering efficiency. Studies of potential use indicate that it may be suitable for heavy-duty brake linings, as the strength-supplying component in formed plastic laminates like radomes and body armor, in high-temperature gasketing, for vibration dampening, and as a flame filter to remove ash in gas turbines. In many applications, its light weight—"Fiberfrax" fiber as manufactured weighs only 2 lb per cubic foot—will prove especially advantageous.

Pilot production equipment at Carborundum can produce the material at the rate of 30 tons a month. A $500,000 plant expansion program will bring this to about 50 tons a day early in 1954. Meanwhile, it is believed that the present production rate can be stepped up if necessary.

"Fiberfrax" fiber is adaptable to the refractory markets served by Carborundum because its high heat resistance, light weight, and low heat transmission make it competitive with insulating refractories for industrial furnace insulation. Vibration tests indicate that it will not settle when used as a furnace lining at the recommended density of 6 lb per cu ft.

Insulation tests show that the new fiber, as compared to high-quality refractory insulating brick, can make impressive savings in weight and furnace efficiency. The savings are sig-

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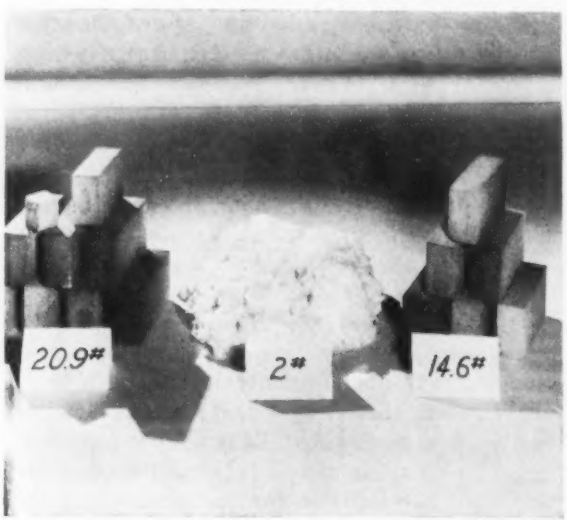
"Requires 30 pct less power to hold furnace equilibrium; time to heat is cut in half . . ."

nificant enough to make the material directly competitive even at the pilot-plant price of $1 a pound. Compared to high-quality cemented refractory insulating brick, tests show that 30 per cent less electrical power is required to maintain furnace equilibrium at 2500°F; time required to bring the furnace up to temperature is cut in half.

"Fiberfrax" fiber is made by melting aluminum oxide and sand in an electric furnace, then subjecting a stream of the molten material to a controlled blast of air. The molten material is blown into a fluffy mass made up of random arrangements of extremely fine fibers. The fibers range up to 3 in. in length and have an average thickness of about 4 microns (0.00016 in.). Although it is produced and collected in a fluffy mass, "Fiberfrax" fiber eventually will be processed into felted blankets, firmly bonded batts, tape, and paperlike forms.

Fiber resists corrosion

The raw materials from which "Fiberfrax" fiber is made and the type of fiber produced account for its unusual properties. Melting of the alumina and silica is done at 3300°F. "Fiberfrax" fiber easily withstands 2300° F without loss of properties and does not soften at temperatures approaching 3000°F. Its inert raw materials provide corrosion resistance, electrical properties, and low thermal conductivity. The fineness of the fibers and their random arrangement produce the efficient filtering abilities of the material. It will remove particles as small as 3/10 micron—which means that it will filter bacteria.



AS FURNACE INSULATOR Fiberfrax has great possibilities. Packed to a density of 2 lb per cu ft, 2 lb of the material fill the same volume as 14.6 lb of high grade refractory insulating brick. But the 2 lb of Fiberfrax are equal in insulating efficiency to 20.9 lb of brick, which would cost $2.40 against a pilot plant price for the fiber of only $2.00.

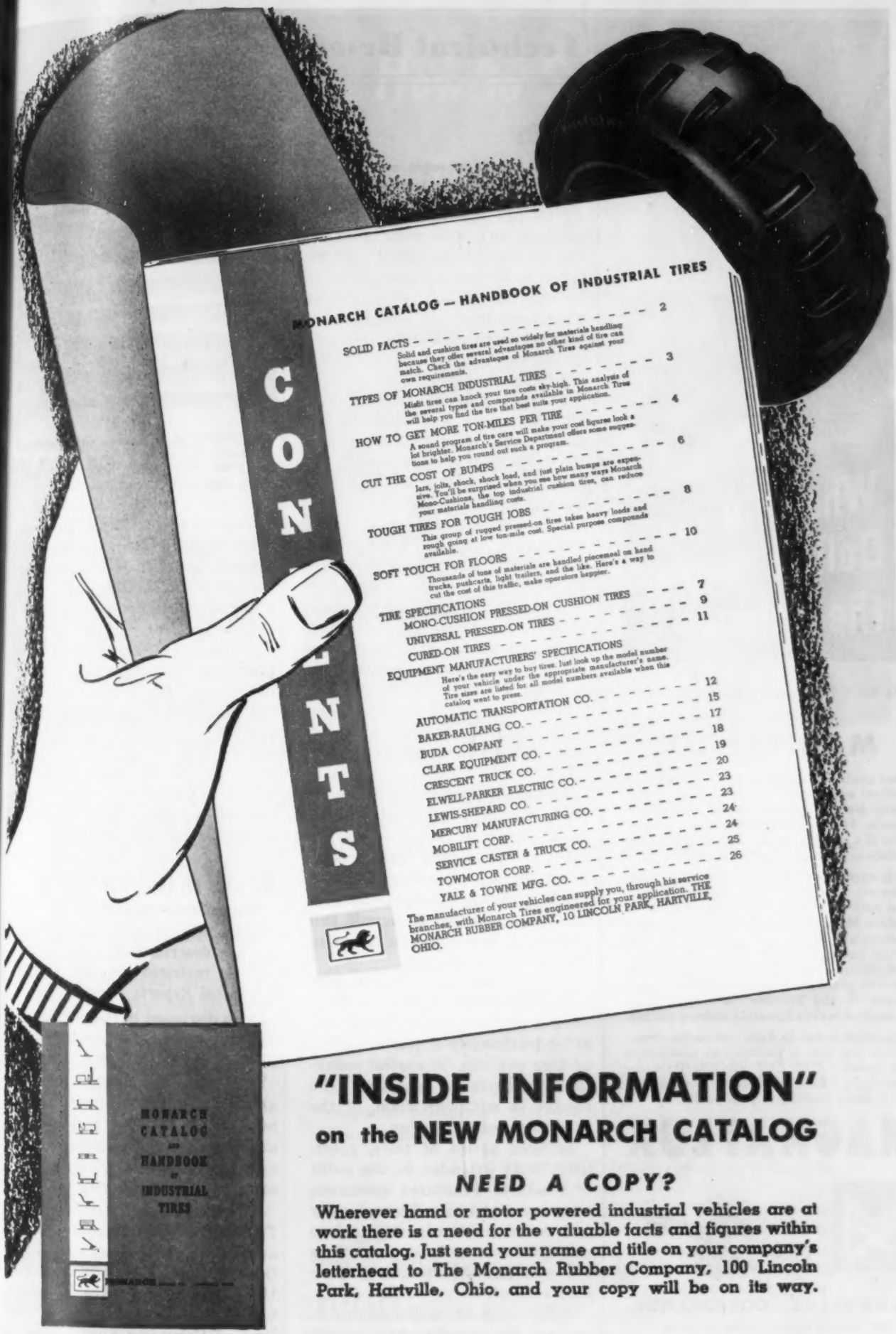
Basically the product is a vitreous ceramic, rather than crystalline. The relatively rapid cooling from the melt provides the fibers with a smooth vitreous surface and long length and may account for their resilience. At the present stage of progress, "Fiberfrax" fiber is not available in spun, woven or filament form, although mixtures with other fibers permits carding and spinning. It should be noted that when fibrous glass was first introduced it was only available in bulk, so other forms of "Fiberfrax" fiber may eventually be commercially practicable.

Competes with asbestos

"Fiberfrax" fiber as now produced can compete directly with extremely fine glass fibers in many applications. Chemical data are still being evaluated, but Carborundum research tests indicate that the material's inert source and very low alkali content make it highly resistant to acid attack. Although Carborundum's work up to now has concentrated on the high temperature possibilities of the material, "cold" applications exist where "Fiberfrax" fiber can compete with asbestos fibers and provide strength, light weight, thermal and electrical properties.

At the present time, an extensive program of tests is now underway by Carborundum. Samples of the material are also out on product test with a number of manufacturers. In the meantime, Carborundum is proceeding with a $500,000 plant expansion program to make "Fiberfrax" fiber in greater quantities and thus reduce unit cost. "Fiberfrax" fiber will be marketed by the Refractories Division of the company, with headquarters in Perth Amboy, N. J.

Carborundum's research engineers came upon the material during their early work on alumina "bubbles" which are extensively used as insulation in high-temperature commercial applications. The bubbles are made by blasting molten alumina with air. During this operation, it was noted that occasionally fibers were formed. By working with alumina and silica, developing modifying agents, and by extensive experimentation with temperatures and air-blast pressures, the researchers were able to carry the blowing process beyond the bubble stage, and in effect blow each bubble into a fine fiber.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Technical Briefs

NICKEL:

Yield, tensile strength and ductility decrease with heat, NBS study shows.

National Bureau of Standards recently completed some interesting studies on the effect of temperature on tensile properties of high-purity nickel. The tensile tests were made at temperatures ranging from —320° to 1500° F. on annealed specimens of nickel of 99.85 pct purity.

Consisting of a series of two tests, the first was made in the range from room temperature to 1500° F. Specimens were 6½ in. long with 2-in. long reduced sections of 0.505-in. diam.

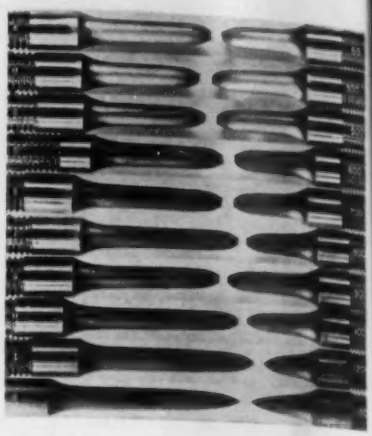
Each specimen was heated and maintained at the desired test temperature, then tested in a hydraulic-type machine (15,000 lb range). The testing machine applied tension to the specimen, producing extension at a controlled rate of about 1 pct per min. The movement of the head and the tension applied to the specimen were recorded by means of an automatic stress-strain recorder.

Liquid Bath—Second series of tests was made at temperatures in a range of from —320° to 212° F. Specimens were essentially the same as those used in the first series, but the procedure had to be modified to permit full immersion in a liquid bath during the testing in tension.

Loading was controlled to produce contraction of the smallest section of the specimen at a rate of approximately 1 pct reduction of area per min. A special reduction-of-area gage measured the change in minimum diam. of the specimen during testing.

In both series of tests, specimens were extended to the point of fracture. Fractured specimens were examined metallographically and tested for hardness. Various graphical comparisons of relations between the observed data were then made.

NBS study of nickel shows in general the metal's yield, tensile strength and ductility at maximum load tend to decrease with increases in temperature. Elongation at complete fracture attains a minimum at about 500° F.



SPECIMENS of high-purity nickel fractured in tension at temperatures of (top to bottom) 88°, 300°, 500°, 600°, 700°, 800°, 900°, 1000°, 1200° and 1500° F.

Irregularities appear in the usual trends of some of the tensile properties in temperature ranges of about 80° to 300° F. and 500° to 700° F. Strain aging apparently occurs in the range of 80° to 300° F., and Curie point behavior in the range 500° to 700° F., while recovery and recrystallization predominate at temperatures of 1200° to 1500° F.

Bulletin on Lost-Wax Casting

Latest developments in the "lost-wax" precision metal casting process are described in a government report reviewed in the current *Technical Reports News Letter*.

Also discussed in this publication are research reports on electroplating and protecting metals.

Feature in the July newsletter is an article which explains how small business leaders can make profitable use, in patent matters, of technical developments made in Germany during World War II.

Single copies of the July 1952, *Technical Reports Newsletter* are available without charge from the Office of Technical Services of the U. S. Dept. of Commerce, Washington 25, D. C., or from the U. S. Dept. of Commerce Field Offices.

WELDING:

Thermite methods used to weld huge 40-ton stern frame sections.

Too large for a one-piece casting, Bethlehem Pacific Coast Steel Corp. is welding stern frames of the five C-4 Mariner-type ships it is building at its San Fancisco shipyard. The huge 39½-ton cast steel frames are made in three sections and then thermit welded.

Before the weld is made, a mold box is built around two sections. Size and shape of the intended weld is formed by means of wax around which is tamped a special mold sand. This is heated and the wax allowed to run out.

STERN FRAMES of C-4 Mariner-type ships, too large to be cast in one piece, are welded together by the thermit method.

Torch-Heated—Heat is applied to dry the sand mold and to bring the two halves of the cast up to proper temperature by means of a gas torch used for nearly 14 hr. Then the thermit, a mixture of finely divided metallic aluminum and metallurgically processed iron oxide, is fired by ignition powder.

A vigorous reaction takes place, producing molten steel at a temperature of approximately 5000°F. A plug is removed from the bottom of the ladles and the highly molten steel is allowed to flow into the cavity in the mold, thus fusing with the two sections.

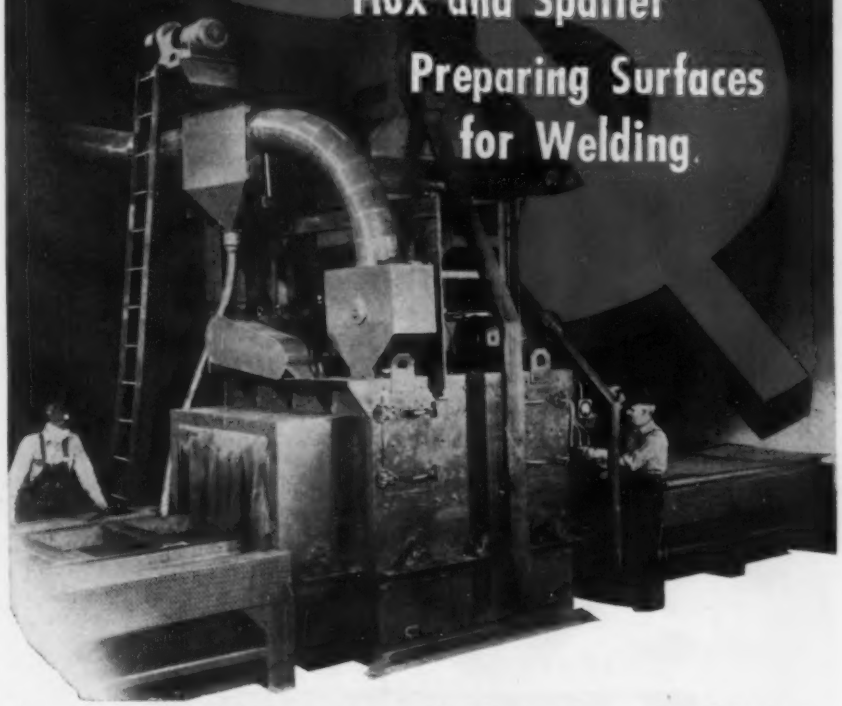
Turn Page

How to SAVE money...

Preparing Weldments for Surface Finishing

Removing Welding Flux and Spatter

Preparing Surfaces for Welding



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Welded assemblies are cleaned mechanically at high speed with the airless Wheelabrator eliminating costly, time-consuming wire brushing, grinding and chiseling. Because of the thoroughness of Wheelabrator cleaning, welds adhere more tenaciously and final finishes are anchored in a permanent bond.

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—Technical Briefs—

MULTIPLE DIES:

Jet transition liner fabrication speeded by four-in-one operation.

Four steps usually involved in fabricating transition liners for jet engines have been telescoped into one operation by Ryan Aeronautical Co., San Diego, Calif. By placing four separate dies on the big bed of a recently installed 600-ton Warco press, one complete transition shell liner is precision trimmed and joggled with each press stroke.

The jet transition liners are irregularly shaped ducts which channel flaming exhaust gases from the combustion chambers to the turbine wheel of the engine. Much like a bazooka gun barrel, they give direction to the searing gases which charge through at 1200 mph. Made of tough, heat-resistant Inconel, they must be formed to extremely accurate dimensions to perform their function.

Speeded Operation—In the Warco set-up, two of the dies precision-

Turn to Page 143

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BIG 600-ton Warco press used by Ryan Aeronautical Co. to fabricate transition liners for jet engines. To speed operation, four separate dies are put on the press.

trim the sides of both halves of the transition liner shell and form the off-set which is later used for the lap seam weld. The other two dies precision-trim the ends of the shells and pierce them with indexing holes. Parts are then given additional work, assembled and seam-welded together with electric resistance welding machines.

Four operators feed the parts to the four dies and shift them, between press strokes, in a continuous sequence. This method saves time, releases equipment and improves quality of the parts.

Turn to Page 146

"Don't tell me you had another argument with the shipping clerk down at the plant."

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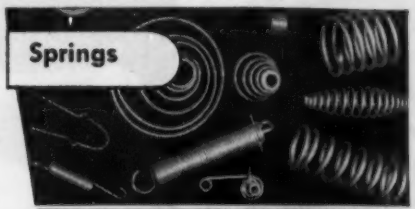

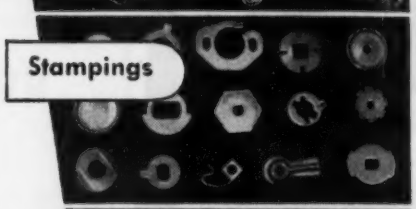

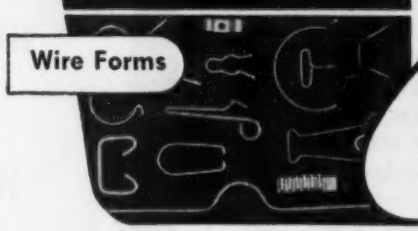

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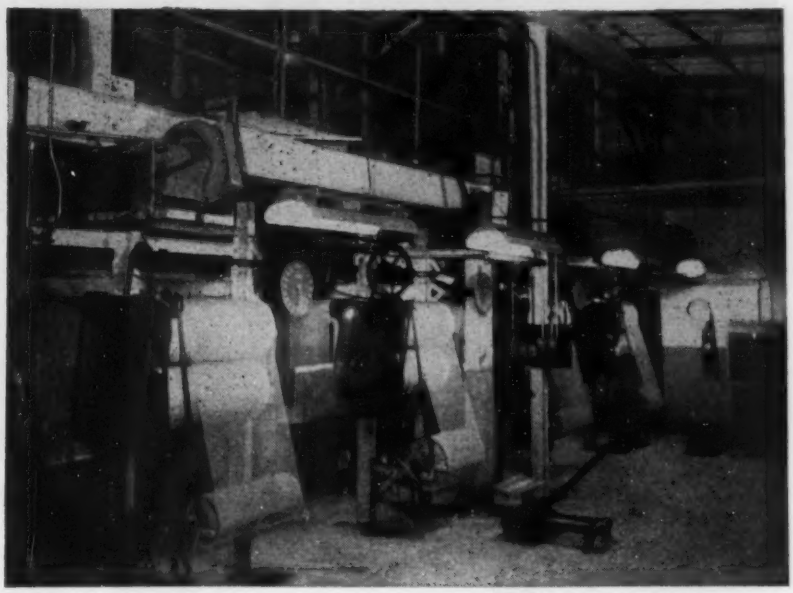

These infra-red Gas-fired units, manufactured by Carbomatic Corporation of New York, are used to dry and polymerize paint on metal screens at Hanover Wire Cloth Division, Hanover, Pa.

Mr. A. Y. Wolff, Ass't General Manager of Hanover Wire Cloth Division has this to say about the Gas-fired Carbomatic units used to coat wire screen cloth with paint:

"The Gas-fired units are performing most satisfactorily, and there haven't been any 'bugs' to plague us. With the excellent cooperation of our paint supplier, we are getting the nicest appearing wire screen cloth in our many years of operation. Every square inch of cloth has a smooth, uniform appearance. As a result, defective production charged against this department is practically non-existent.

"Moreover, the operating costs bore out what our first pilot line indicated—substantial savings are being realized. We are very glad that we decided upon the Gas-fired units."

Gas and Modern Industrial Gas Equipment provided the answer to production problems for Hanover Wire Cloth Division for many reasons. Temperatures, for example, are easy to control precisely, and can be readily maintained *automatically*. Gas is economical and clean, and Modern Industrial Gas Equipment is engineered to fit production-line techniques.

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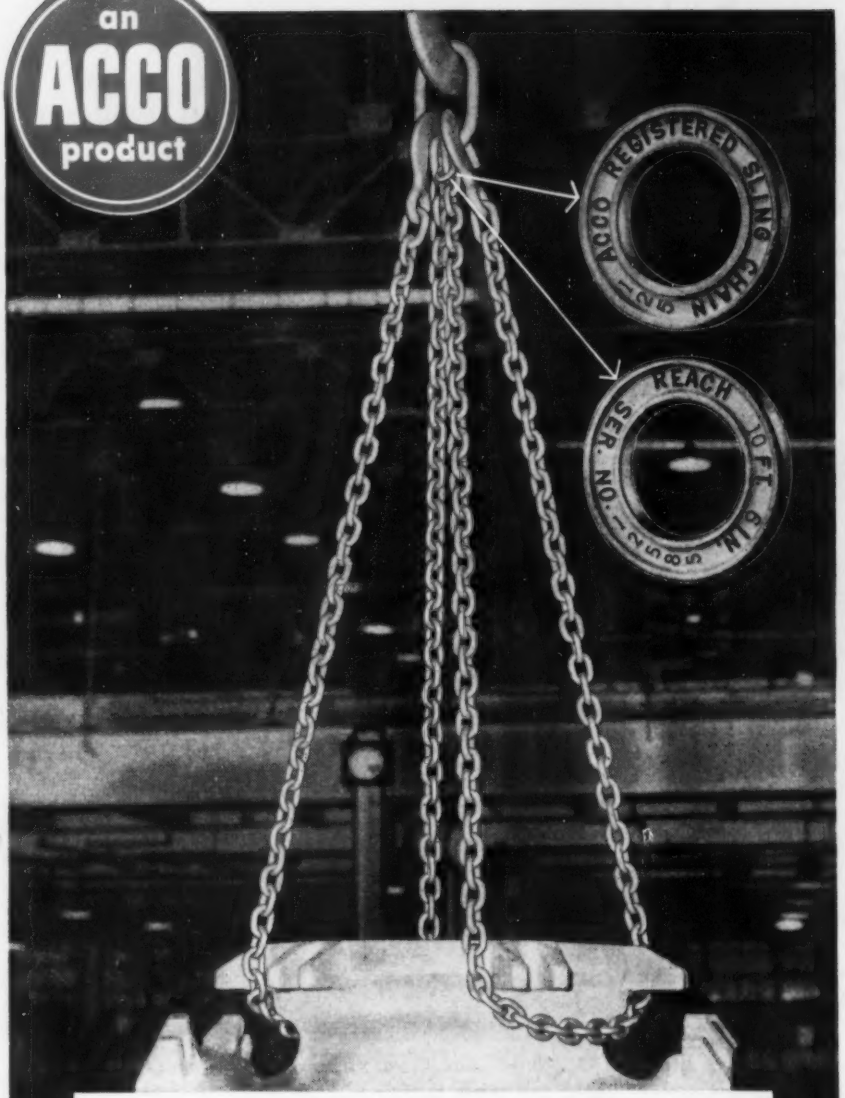

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—Technical Briefs—

RADIANT HEAT:

Concealed wrought iron pipe heating system solves many problems.

New passenger station in Lynn, Mass., is the first on the Boston and Maine R.R. line to have complete radiant heating.

The concealed heating system of wrought iron pipe embedded in the concrete floor is especially suited to the station's long, one-story construction. Selection of the system permitted architects to take full advantage of available space while solving problems peculiar to the building's special heating requirements.

Prevents Heat Loss—In one instance, the system of hidden heat guards against the possibility of excessive heat loss from frequently opened outer doors and the large window area that extends across most of the station's 90-ft front.

Another important problem involved consideration of variations in heating needs. For example, passengers wearing bulky clothing necessary for protection against outdoor winter weather would not be comfortable in shirt-sleeve temperatures suitable for employees of the ticket office.

Although complicated by the fact that the ticket office is not com-

CONCEALED radiant heating system being constructed. Concrete is poured over runs of wrought iron pipe. Varied spacing of pipes was used to meet different heating needs in specific station areas.

pletely separated from the waiting room, the problem was solved by simple engineering of the pipe layout to meet specific comfort requirements for customers and employees.

Spacing of 1¼-in. wrought iron pipe at 8-in. intervals brings extra heat to the ticket office area, while 12-in. spacing of the same size pipe maintains adequate warmth in the entrance-way and main portion of the waiting room. The wider spacing arrangement was also used in the women's and men's lounge rooms, where the area to be heated is small and heat loss negligible.

In the restaurant, which occupies part of the new station, the possibility of excessive heating was effectively curbed by wider spacing of the pipes. Runs of 1-in. pipe are laid on 16-in. centers.

Wax Used for Leakproof Valve

Brooklyn Union Gas Co. is using a synthetic water-soluble wax to make gage valves leakproof during conversion from manufactured to natural gas. Bonnet of each valve is filled with Carbowax compound, which is steamed out easily and completely when the natural gas can be released. Although grease could have been used, the company chose the water-soluble wax because of its ease of removal.

Carbowax is a product of Carbide & Carbon Chemicals Co., New York.

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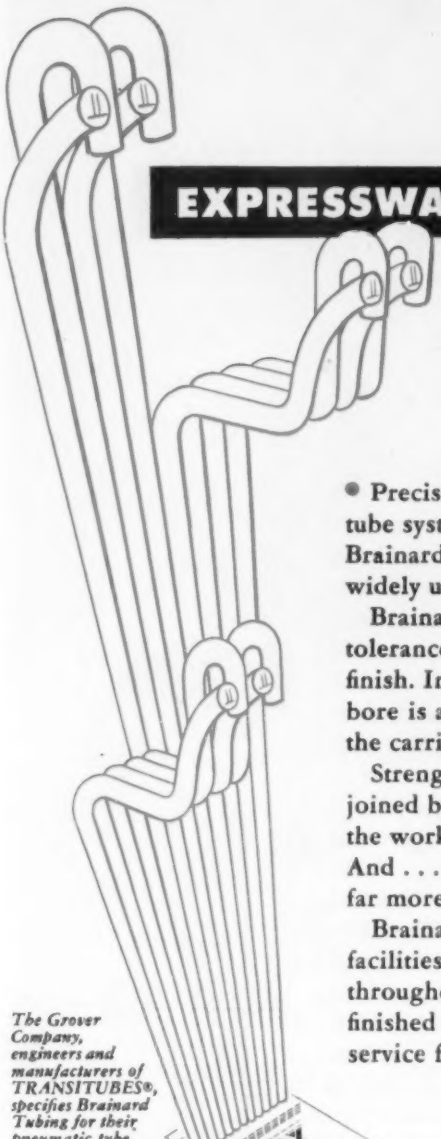

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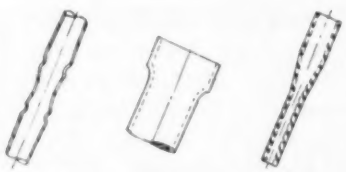

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DISTRICT SALES OFFICES: ATLANTA BALTIMORE BUFFALO CHICAGO CINCINNATI CLEVELAND COLUMBUS DAVENPORT DES MOINES DETROIT GRAND RAPIDS INDIANAPOLIS MILWAUKEE NASHUA NEW YORK PHILADELPHIA PITTSBURGH ROCHESTER SAN FRANCISCO SYRACUSE TOLEDO

—Technical Briefs—

CONDUCTORS:

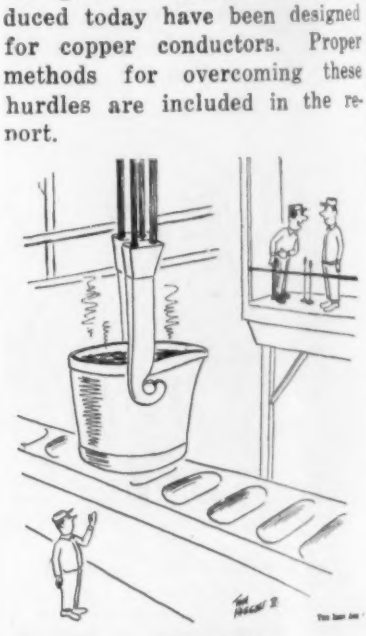
Aluminum and copper compared . . . Differences, answers discussed.

Use of aluminum as an electrical conductor has been investigated by National Electrical Contractors Assn., Inc. A summary of the study points out that there is nothing new about using the light metal for this general purpose though a number of new applications have recently come to the fore as a result of the copper shortage.

Findings indicated that, properly used, aluminum can be practical, safe and cheaper. At present, the organization feels aluminum is economically feasible only in larger sizes of conductor—somewhere in the size range "as large as or larger than No. 6 wire and cable."

Metals Differ—Great emphasis was placed on proper handling of aluminum's different characteristics of larger size (but lighter weight) for conductivity equivalent to copper, rapid oxidation, greater thermal expansion, and different joining and splicing methods. Electrolytic action taking place at copper-aluminum joints was also covered in the report.

Troubles are also encountered because practically all of the fittings and accessories being produced today have been designed for copper conductors. Proper methods for overcoming these hurdles are included in the report.



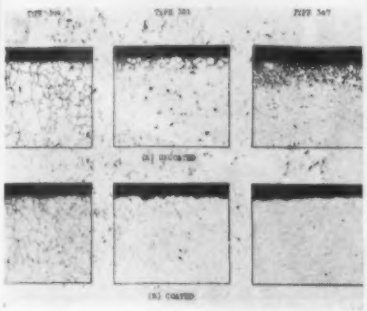
"Allow me."

CERAMIC COATING:

Government tests indicate coating on alloys prevents carbon absorption.

Some of the stainless steels used in aircraft exhaust systems tend to absorb carbon under severe operating conditions. This causes precipitation of carbides at or near grain boundaries, which may result in failures of exhaust parts.

National Bureau of Standards demonstrated in recent laboratory tests that certain NBS ceramic coatings successfully prevent this carbon absorption. Investigated were several NBS ceramic coatings, including types A-417 and A-19H, applied to three 18-8 stainless steels: AISI types, 304, 321, and 347. Coated and uncoated specimens of the alloys were subjected to strongly carburizing conditions at 1350°, 1500°, and 1650°F.



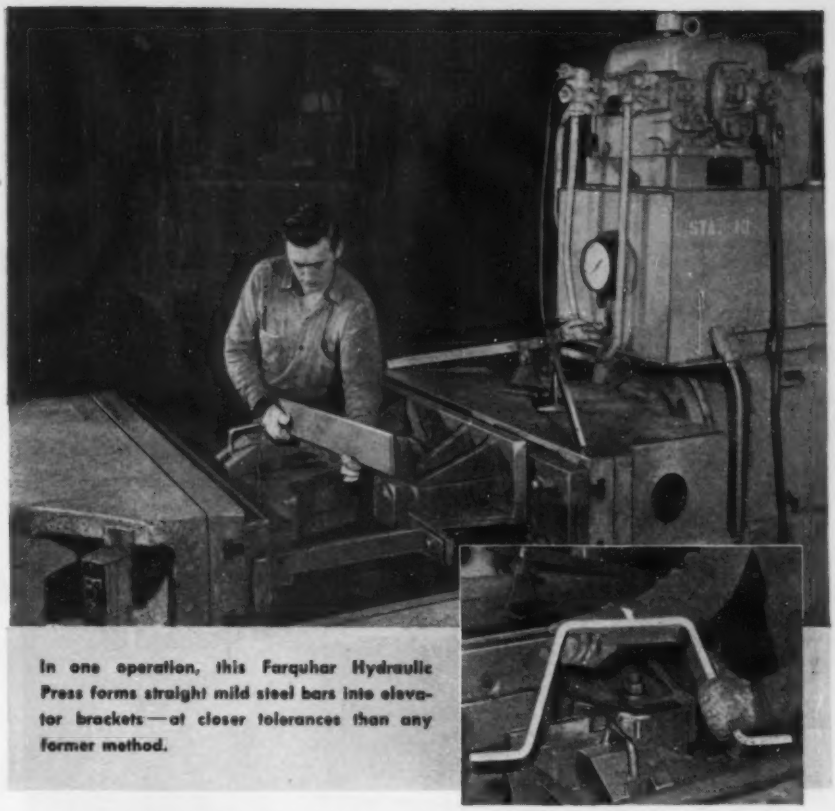
COATED stainless specimens (bottom) show none of the carbon absorption evident in uncoated samples (magnification 100X).

Test Method—Small sheets of the various coated and uncoated alloys were packed in an alloy box with a commercial carburizing compound. The box was then placed in a furnace and slowly heated.

After a cooling period specimens were examined for significant changes in surface appearance and were then sectioned, etched, and examined metallographically. Although some of the coated specimens showed blistering, spalling, or wrinkling, in no case was the metal exposed. Uncoated specimens gave evidence of carbon absorption to depths as great as 0.007 in.

Of those studied, NBS ceramic coating A-19H proved most effective in preventing carbon absorption under all test conditions.

Turn Page



In one operation, this Farquhar Hydraulic Press forms straight mild steel bars into elevator brackets—at closer tolerances than any former method.

OTIS ELEVATOR COMPANY *boosts production, slashes time and labor costs in half, with this*

FARQUHAR HYDRAULIC PRESS

In forming lengths of mild steel, the Otis Elevator Company, world's largest elevator and escalator manufacturer, would heat steel and bend it while it was hot. Trying to improve on this system, Otis Production Engineers developed a cold bending process. Farquhar Engineers were contacted, and a 250 Ton "Bulldozer" Horizontal Press was recommended and installed. By bending the steel bars cold in the Bulldozer, Otis has effected a 50% increase in production alone! Time and labor costs have been reduced an estimated 33⅓%! In addition, the Bulldozer operates at closer tolerances than the old heat and bend method. All this, 8 hours a day, 5 days a week, with maintenance costs that Otis terms "negligible."

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Just one more example of cost-cutting Farquhar performance in heavy production! Farquhar Presses are built for the job . . . assure faster production due to rapid advance and return of the ram . . . greater accuracy because of the extra guides on the moving platen . . . easy, smooth operation with finger-tip controls . . . longer life due to positive control of speed and pressure on the die . . . long, dependable service with minimum maintenance cost!

Farquhar engineers are ready to help solve whatever production problem you may have. Your request will bring them running . . . at no obligation, of course.

Send for free catalog showing Farquhar Hydraulic Presses in all sizes and capacities for all types of industries. Write to: A. B. FARQUHAR Co., Hydraulic Press Department, 1503 Duke St., York, Pa.

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Even your "best" can be improved. A manufacturer of TV transformers formerly shipped 168 units in 15 cartons. Signode helped them work out a multi-unit package combining 175 units in *one*—bound into a compact pallet load with Signode steel strapping. This application was easy to work out but . . .

this one was a toughie!

Diesel springs, heavy and unwieldy, formerly were shipped loose in railway cars. At the point of assembly, each of eight component parts of the spring had to be handled separately. Signode, with the foundry men, worked out a new idea. Three pre-bundled spring assemblies were strapped onto an inexpensive pallet. When the springs reached the assembly line, the steel strapping was left on the individual spring bundles until they were mounted in place. This bundle method cut handling costs 50%!

we'll help you, too!

If you want to try palletizing for the first time, or improve your present methods, we'll help you, too. To have a Signode man call, write

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Steel Strapping Company

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this seal means security in shipping

SIGNODE

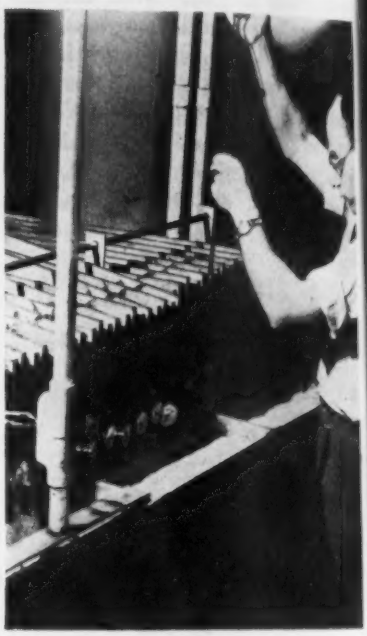
Offices Coast to Coast.
In Canada: Canadian Steel Strapping Co., Ltd.
Foreign Subsidiaries and Distributors World Wide

—Technical Briefs—

RESEARCH:

Multiple specimen furnaces used in continuing copper creep studies.

Recognizing the importance of the creep or stretch which often occurs in metals subjected to prolonged stress at elevated temperature, Chase Brass & Copper Co., Inc., Waterbury, Conn., has been conducting continuing studies of the problem for more than 10 years.



COPPER alloy specimen is placed in multiple specimen creep furnace. Up to 32 samples can be tested for elongation at same time and control is simplified.

From the outset multiple specimen furnaces have been employed. The specimens which are placed in the furnaces are four-ft lengths of thin rods, one eighth in. in diam. Their creep or elongation during the test is measured over a central section of 10 in.

Multiple Furnaces—Stress in each specimen is controlled by means of weights and levers. Multiple specimen furnaces simplify control during tests.

Temperature of each specimen is regulated by means of individual thermocouples which are provided with a means of connection to a laboratory potentiometer for regular checking of individual specimen temperature.

Turn to Page 152

To make a model . . .

. . or move a mountain

. . . let *Lamson* fill your Fastener needs

As one of the few "full line" fastener manufacturers, Lamson can greatly simplify your fastener procurement. For they can supply practically any type or size of bolt, nut or screw plus many special fastening devices such as wire rope clips, cotters and threaded studs.

So if you are now using one or more Lamson fasteners, consider the advantage to you of making Lamson & Sessions headquarters for *all* your fastener needs. It will simplify ordering, speed delivery and save you money in terms of clerical and billing time.

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LOCK NUTS
Economical, vibration proof. Can be used repeatedly.

LOCK THREAD STUDS
Thread locks and seals in standard tapped holes.

CARRIAGE AND MACHINE BOLTS
Cut or rolled threads American Standard Heads.

SQUARE AND HEX MACHINE SCREW NUTS
Semi-finished, hot pressed, cold punched.

MACHINE AND TAPPING SCREWS
Precision made for fast, economical assembly.

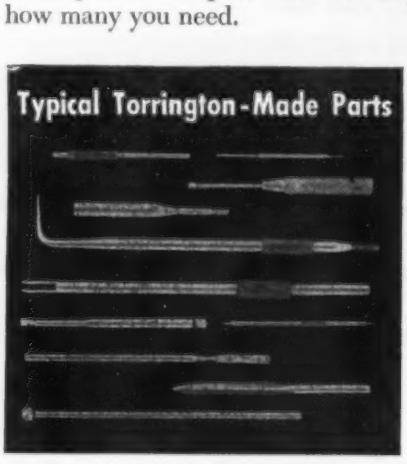
COTTER PINS
Steel, brass, aluminum and stainless steel.

"BENT BOLTS"
Including U bolts, eye bolts, hook bolts, etc.

"Joe, how can we save money on these small parts?"
"Have Torrington make them, Tom! They have the know-how and the equipment to produce precision metal parts at a fraction of what we'd pay anywhere else."

When it comes to holding the line on costs—and holding strict tolerances at the same time—it takes experience and facilities. For over 86 years, Torrington has been making precision metal parts. Production facilities include batteries of automatic and semi-automatic machines—many of them Torrington-designed—and one of the finest heat-treating departments in the world. In addition, we have at our disposal the combined experience and facilities of all 11 plants of The Torrington Company.

If you need precision metal parts, ask us for a quotation. Just send us a sample or blueprint and tell us how many you need.



THE TORRINGTON COMPANY
Specialty Department
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Makers of
TORRINGTON NEEDLE BEARINGS

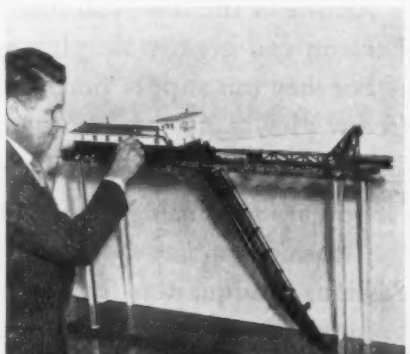
—Technical Briefs—

FABRICATING:

Small dredge constructed for use in Alaskan channel digging project.

Construction of the Lake Eklunta Power Project, 45 miles inland from Anchorage, Alaska, required dredging a half-mile long, 85-ft deep channel in the lake bottom. As a result it was necessary to build a dredge that could be economically disassembled and shipped to Anchorage and then transshipped over difficult terrain to the site of operations.

Ben C. Gerwick, Inc., associated with Hydraulic Dredging Co., Ltd., Oakland, Calif., undertook the project. To meet the difficult problems involved in shipping the dredge, the Gerwick company had to design a dredge that had no part wider than 10 ft nor longer than 40 ft, and with no section weighing more than 15 tons. Bethlehem Pacific built the unit.



SCALE model of dredge used in Alaskan project. Digging ladder, which can be raised or lowered by means of small winch, is shown at its maximum digging depth.

Separate Foundation — Digging ladder of the completed dredge is 100 ft long from center of trunnions to ladder head. On top is bolted a separate foundation on which are mounted the 75 hp cutter motor, reduction gear, and a special cutter shaft thrust bearing assembly.

The hull incorporated 49 of the familiar 5x5x7 ft. CB tanks which have been fastened together with 6x6½-in. corner angle strength members to make nine hull pontoons.

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Torrington Swaging Machines taper both tubular and solid work quickly, accurately and economically. Delivering 4000 hammer blows a minute, the swager gives the metal toughness and resiliency... utilizes all the stock.

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Will Steel Increase Wreck Price Controls Setup?

New price, wage demands to hit OPS in neck . . . Fabricators insist they must have higher ceilings to pass through cost boosts . . . Administration sets off new round of inflation.

The headsman's axe is ready to fall on the neck of the Administration's price control system. Office of Price Stabilization's steel product price increase order became official this week. And almost in the same breath Wage Stabilization Board empowered its regional offices to grant the 21.5¢ steel wage settlement package to companies tied to the steel industry. Fabricators of metal products found these inflationary pressures too cruel to endure and clamored to OPS for price relief.

Washington was almost helplessly watching a new concept of price controls take shape. Industry was in a strong position to take over their administration. OPS meanwhile wrangled over what percentage of manufacturers' higher costs may be passed through ceilings. The following percentages are being discussed.

Materials—100 pct.
Transportation—75 to 100 pct.
Labor—50 pct.

Where It Started—Talking big about holding the price line, the Administration has been maneuvered by unyielding economic facts of life into springing the lid on the next round of inflation. They can look back ruefully at the super-generous wage rise "suggested" by WSB as starting the entire cycle. This boomerang has increased costs to thousands of manufacturers and now threatens to afflict many with higher wage contracts. Whether subsequent inflation will be moderate or steep is guesswork.

Higher costs have been borne by manufacturers without a whimper since the July 1951 cutoff date of the Capehart Amendment. Now there is in addition to higher labor and transportation costs new increases in steel, copper, and aluminum. Many firms are at the breaking point where they must have pricing relief. The original Administration idea that manufacturers must humbly absorb steel price hikes has been scrapped as ridiculous.

Urgent Pressure — Pressure on OPS to issue its pass-through order in haste is urgent. It may come next week in the form of a General Overriding Reg., retroactive to the date of the steel price increase, July 26, 1952.

And its administering may be industry's job. With half a staff OPS cannot handle a task of such magnitude. As much as it hates relinquishing power, OPS may find itself merely a weak policy agency while industry regulates itself.

It is recalled that higher steel prices in 1946 were deemed largely instrumental for lending the coup de grace to federal price controls then. Today, the situation is similar—and there is the impetus of price boosts in aluminum and copper. The government's "solid front" has been irreparably breached.

On Political Front—Price increases and wage increases are bound to have political repercussions—especially in an election year. They bear out something that has long been said: "Mr. Truman only talks price controls."

IRON AGE learned that a number of Republican Congressmen are getting set for the Administration to try writhing clear of inflation charges. They expect the President's future speeches to rant against the steel industry and the Republicans as being the villains. They predict he will ignore explaining how a minority party in Congress could write such a puny price control law. Democratic line will be that the party tried to hold the price line but was trampled by selfish interests.

Some high-powered economists in Washington hope the Democrats will be saved from inflation by the natural competitive actions of free enterprise. If competition and sluggish consumer demand hold inflation to tractable levels and force competing manufacturers to absorb some of the price rise sting, it will certainly not be to the Democrats' credit.

Steel Price Rises—The price increases authorized by OPS this week advanced THE IRON AGE finished steel base price composite by approximately $5 a net ton to a figure of 4.376¢ per lb. This is an advance of 5.9 pct but it does not indicate that actual steel prices were advanced any more than the 4.7 pct which the government reported. In most cases "extra" charges for physical, chemical, quantity and other special characteristics desired by the customer were not included in the increase.

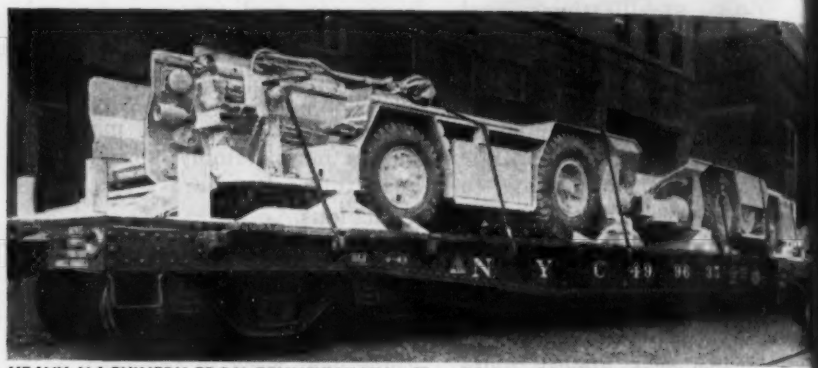
Steelmaking operations this week are scheduled at 98.5 pct of rated capacity, up 2½ points from last week's revised rate.

Freight Cars—Supply of freight cars is tight in some industrial centers. Although not serious the scarcity developed sooner than had been expected. Hardest to get are gondola cars, used to ship finished steel and steel scrap. Hopper cars are easier but may get tighter.

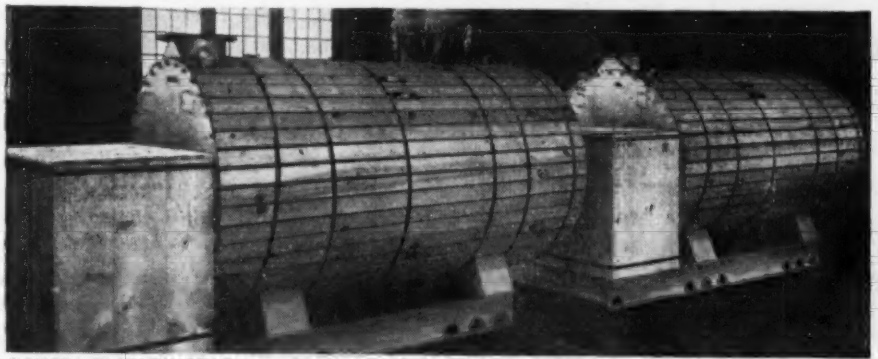
Acme Steel Strapping Insures S.A. *(Safe Arrival)*

Cuts costs on packing, loading, shipping, too!

KITCHENWARE FROM CALIFORNIA is strapped together, three or four cartons to a bundle, for faster handling, reduced damage and less pilferage.



HEAVY MACHINERY FROM PENNSYLVANIA. Two 12-ton shuttle-cars are loaded on one railroad flatcar for shipment. To hold them in place, other methods proved unsatisfactory, but Acme Steel strapping did the trick, provided security and cut both labor and material costs at the same time.

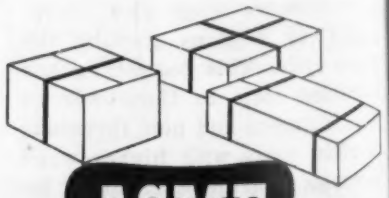


BOILERS FROM WISCONSIN used to be packed in boxes for export. Now they're wrapped in lightweight slats held in place by Acme Steel strapping. The new way not only means safe delivery—it saves 50% on packing costs.

YOU KNOW WHERE YOU'RE GOING in Oakland, California. They now fasten their street signs *securely* and economically with Acme Steel strapping.

You name it. Name just about anything you eat or wear or sit on or live in. Chances are that Acme Steel strapping helps get it to you safe. All or part of almost everything you use travels at least part way to you protected by steel strapping.

Acme Steel strapping not only insures safe arrival but it cuts costs, too, on packing, loading and shipping. We have many striking examples of this. Write for them to Acme Steel Products Division, Dept. IA 82.



ACME STEEL

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Market Briefs

Civilian Steel—It's authoritatively reported Washington has decided to take a firm stand against increasing steel allocations to non-defense producers. Feeling is that once the gates are opened to some, a multitude of others will apply for equal treatment. Chances of military demand for steel easing in the next 2 months are not good. Because of Washington's attitude, Detroit automakers may not be able to get extra steel allocations from National Production Authority.

Coal Hike—Larger tonnages of certain sizes of anthracite coal will become available to industrial users, government price-setters say, as a result of their action permitting a price rise of 75¢ per net ton f.o.b., Pennsylvania mines. This increase applies to standard and sub-standard coal and covers about 45 pct of total anthracite sales. Sizes affected are No. 1 Buckwheat, Rice, Barley and Buckwheat No. 4, and smaller sizes. Price rise was authorized by Amend. 4, Ceiling Price Reg. 4.

Fair Auto Output—This may be the first week automakers reach respectable production since layoffs started. Output situation will be spotty, however. Auto output dropped 25 pct last week when Ford assembly plants came to a standstill. Ford will be producing again this week. In Detroit, steel supply is critical, but an easing in sheets has been noticed. This improvement, however, is relative to other more desperate shortages like bars. Auto people won't book conversion steel past 3 months because they see a considerable easing in supply. In Washington, National Production Authority had completed at press time an order permitting limited conversion.

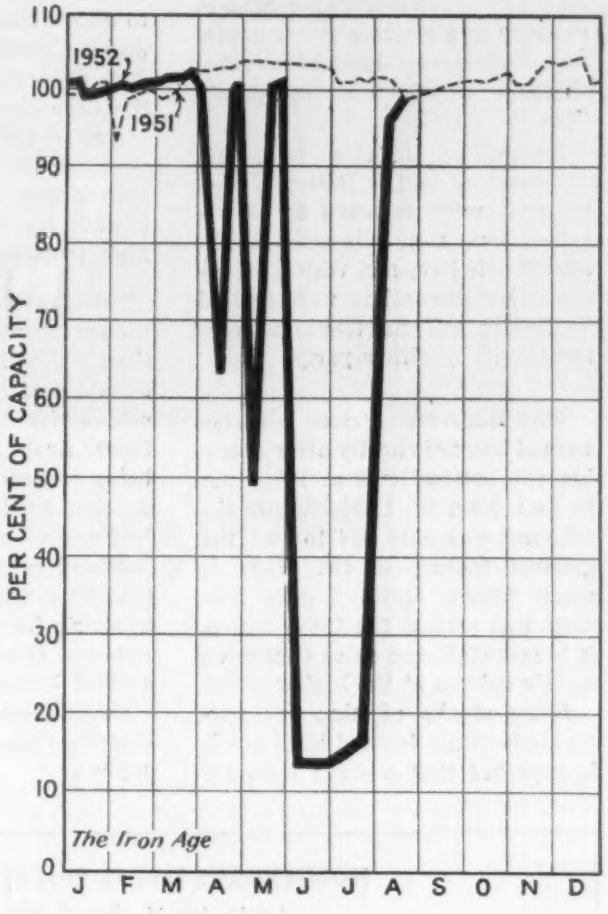
European Steel Production—Steel output in 16 European contries outside the Iron Curtain may reach a total of 72 million tons next year, reports American Iron & Steel Institute. If this level is achieved it will give Free Europe a 17 million ton edge over the 55 million tons Russia and its satellites are expected to produce. Breakdown of production rates for some of the leading European nations in 1953 is anticipated to be about as follows: United Kingdom, 20 million tons; West Germany, 16 million tons; France (including the Saar), 16 million tons; Belgium, 6 million tons, and Luxembourg 3.5 million tons.

Jet Parts—Fiat Co., Modena, Italy, has been licensed to manufacture spare engine parts for Allison JG-35-A-29 engines in Republic F-84G Thunderjets sold to the Air Force and North Atlantic Treaty Organization countries.

Lost Shipments—Tie-up of the Lake fleet resulting from the steel strike caused ore shipments during July to drop to 1,903,672 gross tons as compared with 13,574,174 tons in July 1951, a Lake Carriers' Assn. report shows. But the speed with which shipments resumed after the strike settlement has surprised most shippers.

Oil Loss—Oil drilling in the U. S. won't fully recover from the steel strike until early next year, as government experts see it. Lack of steel for drilling equipment will result in loss of about 113,000 bbls per day of planned crude oil production.

Steel Operations



District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Aug. 16	82.0*	97.5	99.0*	98.0	95.0*	109.0	102.5*	101.0*	87.0*	97.5	50.0	104.0	92.0	96.0*
Aug. 17	99.0	98.5	100.0	100.0	104.0	104.5	101.5	103.0	95.0	104.0	60.0	104.0	112.5	98.5

Beginning Jan. 1, 1952, operations are based on annual capacity of 108,587,670 net tons.
* Revised

Tin Market Getting Back to Normal

RFC holds $1.21½ per lb prompt price while trans-shipped material is finding its way into open trading . . . Zinc price stages small comeback despite vast stocks—By R. L. Hatschek.

Business in the tin import trade is rapidly approaching a normal state. World prices dropped off immediately after the resumption of U. S. imports by private firms but have been rising steadily since at both London and Singapore.

Reconstruction Finance Corp. is maintaining its $1.21½ per lb price for prompt delivery and tin is now finding its way into the New York open market for prompt delivery at a slightly lower quotation. This material has been transshipped from less distant points than the Far East.

Meanwhile, tin talks with representatives of the Bolivian Government were expected to be resumed some time this week. Bolivian officials have met with RFC recently but discussions were limited to feelers and no tonnages were mentioned by either party.

Zinc Recovers—Prices for zinc turned upward shortly after reaching the bottom level at 13½¢ per lb f.o.b East St. Louis. While the rebound was only ½¢ to 14¢, the general feeling in the trade is much firmer. Quite a good tonnage was sold at the 13½¢ figure, it is reported, and sales continued in fair volume at the higher price.

Huge stocks of zinc are currently holding demand back but it is expected that a much stronger tone will be felt once the big galvanizing companies are all back in the market.

Copper Deliveries Up — Members of the Copper Institute reported domestic deliveries to fabricators totaling 115,179 tons in July. This compares to the year's low of 98,416 tons delivered in June. Refined production in the U. S. rose from 92,151 tons in June to 96,049 tons last month but production outside the nation's borders dropped to 99,201 tons from the June figure of 114,421 tons.

One of the more surprising aspects of the increased delivery rate in July is that this is traditionally a vacation month in which high tonnages are not consumed.

Self-Certification — Brass and bronze foundries consuming less than 10,000 lb of copper raw materials may soon be permitted to self-certify their allocated quantities. Such a move is currently being considered by National Production Authority and would affect approximately 860 foundries. Industry representatives estimate that 50 pct of the foundries now applying for allocations would be removed from direct allocation control by self-certification.

Suggestions—NPA is also considering these industry recommendations:

(1) Large foundries using more than 100,000 lb per month should continue to receive monthly allocations.

(2) Medium size foundries using 10,000 to 100,000 lb monthly should continue to get allocations on a quarterly basis.

(3) Dir. 1 (advance authorizations) to order M-16 (copper raw materials distribution) should be amended to allow medium foundries, which now receive quarterly allocations, to receive quarterly advance authorizations equivalent to 50 pct of their allocations.

Getting Rough — Bitterness in the strike of Scovill Mfg. Co. employees is mounting. The company fired 14 employees of its Oakville Div. on the charge of participating in acts of violence during the strike.

Union representatives then labelled the action illegal and asserted there would be no discussions on settlement until the men had been reinstated. Negotiations were scheduled for resumption early this week between union, company and federal mediators. Bargaining at American Brass Co. was resumed last week.

Not Happy—Independent aluminum fabricators are somewhat disgruntled at what they feel is discrimination against them. Office of Price Stabilization allowed them a 5 pct increase in prices, the same as allowed the primary metal producers. But aluminum pig and ingot were increased 1¢ per lb—better than 5 pct—and the labor, freight and other costs of the independents have risen also.

Primary producers were not exactly joyous at the amount of increase permitted but labor costs for the fabricators are much higher. They employ more men per lb of product—it's that simple. Whether they will actively go after a further increase is not known, but they constitute small business in many cases and this is an election year.

NONFERROUS METAL PRICES

	Aug. 13	Aug. 14	Aug. 15	Aug. 16	Aug. 18	Aug. 19
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.2075	$1.2075	$1.21	.....	$1.2125	$1.2125*
Zinc, East St. Louis	14.00	14.00	14.00	14.00	14.00	14.00
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80

Note: Quotations are going prices.
*Tentative.

"I don't know why this feels different —but I'll find out!"

Familiarity breeds suspicion—when something *unfamiliar* turns up in an article of everyday use. You can tell by the heft, the feel, the look, *when something has been subtracted.* And time will tell the rest of the story.

Cosmetic containers and costume jewelry have long been on the Brass standard. For Brass, with its matchless workability . . . and the unlimited freedom it gives to product-designers . . . has no rival in production cost-control. Nor in customer-appeal, with its rich range of alloy-colors, its solid feel of quality, its improvement with age and wear.

No, there's no substitute for Brass . . . as customers are quick to notice. And there's no reason for substitutes, for the only shortage now is the shortage of good excuses for the lack of copper. *There is no lack.* So if *your* product is based on the golden-yellow standard . . . Brass . . . then keep it there. There's no reason *in the world* to trade down your quality. In fact, see what kind of action you can get from Bristol Brass on sheet, rod, or wire.

. . .

The BRISTOL BRASS CORPORATION, makers of Brass since 1850 in Bristol, Conn. Offices or warehouses in Boston, Chicago, Cleveland, Dayton, Detroit, Los Angeles, Milwaukee, New York, Philadelphia, Pittsburgh, Providence, Rochester.

"Bristol-Fashion" means **Brass at its Best**

Nonferrous Prices

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 31.6¢; 4S, 61S-O, 33.6¢; 52S, 35.8¢; 24S-O, 24S-OAL, 34.5¢; 75S-O, 75S-OAL, 41.9¢; 0.081 in., 2S, 3S, 32.8¢; 4S, 61S-O, 35.2¢; 52S, 37.4¢; 24S-O, 24S-OAL, 35.8¢; 75S-O, 75S-OAL, 43.9; 0.032 in., 2S, 3S, 34.5¢; 4S, 61S-O, 39.0¢; 52S, 41.8¢; 24S-O, 24S-OAL, 43.8¢; 75S-O, 75S-OAL, 54.8¢.

Plate ¼ in. and Heavier: 2S-F, 3S-F, 29.7¢; 4S-F, 31.7¢; 53S-F, 33.4¢; 61S-O, 32.3¢; 24S-O, 24S-OAL, 34.0¢; 75S-O, 75S-OAL, 40.7¢.

Extruded Solid Shapes: Shape factors 1 to 5, 35.5¢ to 77.2¢; 12 to 14, 36.2¢ to 93.5¢; 24 to 26, 38.7¢ to $1.22; 36 to 38, 45.9¢ to $1.79.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 39.4¢ to 35.2¢; cold-finished, 0.375 to 3 in., 2S-F, 3S-F, 42.5¢ to 36.8¢.

Screw Machine Stock: Rounds, 11S-Ts, ⅛ to 11/32 in., 56.2¢ to 44.1¢; ⅜ to 1½ in., 43.6¢ to 41.0¢; 1 9/16 to 3 in., 40.4¢ to 37.8¢; 17S-Te, 1.6¢ per lb lower. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 41.5¢ to 30.5¢; 52S, 50.4 to 36.8¢; 56S, 53.6¢ to 44.1¢; 17S-T4, 56.7¢ to 39.4¢; 61S-T4, 50.9¢ to 38.9¢.

Extruded Tubing: Rounds, 63S-T5, OD in.: 1¼ to 2, 38.9¢ to 56.7¢; 2 to 4, 35.2¢ to 47.8¢; 4 to 6, 35.7¢ to 43.6¢; 6 to 9, 36.2¢ to 45.7¢.

Roofing Sheet: Flat, 0.019 in. x 28 in., per sheet, 72 in., $1.199; 96 in., $1.598; 120 in., $1.997; 144 in., $2.398. 0.24 in. x 28 in., 72 in., $1.448; 96 in., $1.931; 120 in., $2.414; 144 in., $2.897. Coiled sheet: 0.019 in. x 28 in., 26.6¢ per lb: 0.024 in. x 28 in., 28.2 per lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 63¢; 3/16 in., 65¢; ⅛ in., 67¢; B & S Gage 10, 68¢; 12, 72¢. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.067; ¾ in. to 5/16, $1.40; 5/16 to ⅝, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ⅞, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	77	60½
Strip, cold-rolled	83	63½
Rods and bars	73	58½
Angles, hot-rolled	73	58½
Plates	75	59½
Seamless tubes	106	93½
Shot and blocks	..	53½

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	45.52	....	45.12
Copper, h-r	....	41.37	....
Copper, drawn	....	42.62	....
Low brass	42.34	42.03	....
Yellow brass	40.17	39.86	....
Red brass	43.10	42.79	....
Naval brass	44.72	38.78	40.04
Leaded brass	....	....	38.02
Com'l bronze	44.39	44.08	....
Mang. bronze	43.44	42.83	42.89
Phos. bronze	64.72	64.97	....
Muntz metal	42.69	38.25	39.50
Ni silver, 10 pct	51.96	54.18	....

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	20.00
Aluminum pig	19.00
Antimony, American, Laredo, Tex.	39.00
Berryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.50
Bismuth, ton lots	$2.35
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$2.40 to $2.47
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$200
Lead, St. Louis	15.80
Lead, New York	16.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb.	24.50
Magnesium, sticks, 100 to 500 lb.	42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$186 to $189
Nickel electro, f.o.b. N. Y. warehouse	59.58
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	83.25
Tin, New York	$1.2125
Titanium, sponge	$... 00
Zinc, East St. Louis	14.00
Zinc, New York	14.83
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	27.25
No. 120	26.75
No. 123	26.25
80-10-10 ingot	
No. 305	33.00
No. 315	30.50
88-10-2 ingot	
No. 210	41.50
No. 215	40.00
No. 245	34.50
Yellow ingot	
No. 405	23.25
Manganese bronze	
No. 421	30.50

Aluminum Ingot

(Cents per lb, 10,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	20.6
0.60 copper, max.	20.4
Piston alloys (No. 122 type)	20.5
No. 12 alum. (No. 2 grade)	19.5
108 alloy	20.6
195 alloy	20.8
13 alloy (0.60 copper max.)	20.8
ASX-679	20.5
Steel deoxidizing aluminum, notch-bar granulated or shot	
Grade 1—95-97½%	18.80
Grade 2—92-95%	18.60
Grade 3—90-92%	18.40
Grade 4—85-90%	18.20

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	37.84
Electrodeposited	33¾
Flat rolled	38.34
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball, anodes	25½
Nickel, 99 pct plus	
Cast	76.00
Rolled, depolarized	77.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	97½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	62
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21½	20½
Yellow brass	19½	18½
Red brass	20½	19½
Comm. bronze	20½	19½
Mang. bronze	18½	17½
Brass rod ends	18½	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	17.25*
Radiators	14.75

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	18.50
No. 1 comp. turnings	18.25
Rolled brass	15.50
Brass pipe	16.50
Radiators	14.75
Aluminum	
Mixed old cast	9 — 9¾
Mixed new clips	10 — 11
Mixed turnings, dry	9 — 9½
Pots and pans	8½ — 9

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	18¾ — 19¼
No. 2 heavy copper and wire	17 — 17½
Light copper	15½ — 16
New type shell cuttings	15½ — 16
Auto radiators (unsweated)	14 — 14¼
No. 1 composition	17½ — 18
No. 1 composition turnings	17 — 17½
Unlined red car boxes	16¼ — 17
Cocks and faucets	15 — 15¼
Mixed heavy yellow brass	11½ — 13
Old rolled brass	14½ — 15
Brass pipe	15½ — 16
New soft brass clippings	16 — 16½
Brass rod ends	15½ — 16
No. 1 brass rod turnings	15 — 15½
Aluminum	
Alum. pistons and struts	6 — 6½
Aluminum crankcases	7 — 7½
2S aluminum clippings	10 — 10½
Old sheet and utensils	7 — 7½
Borings and turnings	5 — 6
Misc. cast aluminum	7 — 7½
Dural clips (24S)	7 — 7½
Zinc	
New zinc clippings	5 — 5½
Old zinc	6 — 6½
Zinc routings	3¾ — 4¼
Old die cast scrap	4¾ — 5
Nickel and Monel	
Pure nickel clippings	35 — 36
Clean nickel turnings	35 — 36
Nickel anodes	35 — 36
Nickel rod ends	35 — 36
New Monel clippings	28 — 29
Clean Monel turnings	20 — 21
Old sheet Monel	28 — 29
Nickel silver clippings, mixed	13 — 14
Nickel silver turnings, mixed	12 — 13
Lead	
Soft scrap, lead	12½ — 13
Battery plates (dry)	7 — 7½
Batteries, acid free	4 — 5
Magnesium	
Segregated solids	15 — 16
Castings	14 — 15
Miscellaneous	
Block tin	100 — 110
No. 1 pewter	70
No. 1 auto babbitt	55 — 60
Mixed common babbitt	14½ — 14¾
Solder joints	19 — 20
Siphon tops	60
Small foundry type	19 — 19½
Monotype	15½ — 16
Lino. and stereotype	13½ — 14
Electrotype	12 — 13½
Hand picked type shells	9¾ — 10
Lino. and stereo. dross	7
Electro. dross	6¼

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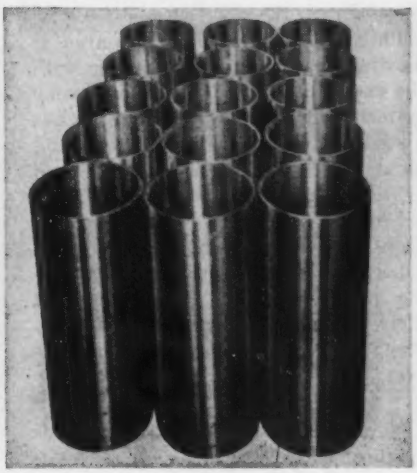
SAND CASTINGS



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Freight Car Shortages Trip Deliveries

Some scrap centers report car shortages hampering movement . . . Shortage had not been expected this soon . . . Rush to ship after strike, tieups seen as reasons for dislocation.

Scrap men report shortages of freight cars hampering their deliveries. Supply of freight cars is now acknowledged to be tight. Railroads and their traffic directors are keeping their fingers crossed, but say the situation is not serious yet. They had expected a dislocation but had not expected it would develop so soon.

Part of the reason for the shortage is the frantic shipment of finished steel from mills and heavy incoming shipments of raw materials. Unloading tieups at scrap and raw-material yards may also have fractured freight car scheduling a little.

Hardest to get are gondola cars, used extensively for shipment of scrap and finished steel. Hopper cars are easier but will get tighter. Box cars are now scarce in the Pittsburgh area. New England, Cleveland, and New York scrap men have reported being hampered in shipping by car shortages.

Demand for cars soared with the end of the steel strike. Mills shipped everything available to steel-starved defense and civilian consumers. Other industries which had held up shipments during the steel strike moved into the scramble. The cumulative effect of all this led to the present scarcity.

Pittsburgh—A shortage of freight cars developed over the weekend. Lack of cars has delayed shipments by some dealers. Shortage was believed due to heavy incoming shipments to mills and stepped-up movement of finished steel. Consumers continued to regulate shipments to relieve congestion at unloading stations. Market was strong, with cupola cast moving back up to ceiling after weeks at under-ceiling quotations.

Chicago—Scrap movement continues fairly slow although collections are picking up somewhat. Demand for all blast furnace and steelmaking grades continues firm at ceiling. Cast continued to strengthen slowly and ceiling was offered for clean motor blocks.

Philadelphia—Scrap in the area is moving steadily at ceiling prices with the exception of cast grades. Foundry material did reach up to ceilings but a strike at one of the main consuming plants turned the market weak and prices dipped again. Auto wreckers all say they will start full cutting operations next month, but they are not expected to play a large part in boosting scrap supplies. Reason is that their yards are not nearly so full as they were in the early part of the year.

New York—Although flow of steelmaking scrap continues at a brisk pace, mills are still fussy. There have been a few rejections cropping up. Blast furnace grades were stronger at ceiling. Cast showed a surge of new strength last week and foundries may come into the market to pick up inventory. Some dealers are losing out on cast contracts at today's higher prices. Freight car troubles continued to badger the trade.

Detroit—Scrap picture here began to look a lot better as auto plants started to generate scrap in larger quantities. At the same time, the market stood firm at ceiling in blast furnace and steelmaking grades. Cast scrap continued to strengthen. Spot sales were made in nearly all grades at ceiling. But most cast, with the exception of clean auto cast, was still slightly below ceiling.

Cleveland—Scrap was beginning to move more freely this week. A Valley mill that had held up all shipments has resumed acceptance of material. Prices held unchanged. Market continued strong despite large inventories held by consumers. Electric furnace scrap was expected to become tight. Dealers were complaining over difficulty in obtaining freight cars.

St. Louis—A district steel mill came into the market this week with orders for an estimated 10,000 tons of No. 2 heavy melting steel at ceiling, but with a springboard of $3, as compared with $2 previously. Same mill also bought a substantial tonnage of heavy breakable and charging box cast at shipping point ceiling with a spring board of from $6 to $10 depending upon the time of delivery. Steel mills which have about relieved the congestion in their yards are expected to come into the market right after Labor Day.

Birmingham—Heavy melting scrap is plentiful in the district now, but mills are limiting orders, although still paying ceiling prices. Cast scrap is becoming scarce. Birmingham foundries will pay no more than $45 for No. 1 cupola cast and $41 for stove plate. One Tennessee foundry, however, paid $47 for No. 1 cast this week.

Cincinnati—With two district mills back in operation after long strikes, the market here became more active this week. Scrap that had been on track was moving into one mill, and a release on shipments from dealers' yards was expected tomorrow. Market was strong with prices unchanged.

Boston—Scrap movement in New England is being bedeviled by a freight car shortage. It cropped up in the past week or two and nobody can forecast how long it will last. Business in the trade is described as "just fair" and prices are unchanged with the exception of stoveplate.

West Coast—Volume remained good in steelmaking grades as yards continued to fill old orders. But little is coming into the yards so scrap scarcity may be looming for fall. Mill inventories are good, of course. Movement of cast improved considerably as most dealers gave up their waiting game. Prices remained steady in all departments.

Buffalo—Much stronger price tendencies prevail in the scrap market. All prices are returning to ceiling levels as leading mill consumers make substantial purchases. New business was reported in steelmaking and cast grades at top levels. Dealers' yard stocks, accumulated during strike, are moving at a good clip.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Iron and Steel SCRAP PRICES (Maximum basing point prices, per gross ton, as set by OPS in CPR 5 and amendments.)

Switching Charge (Dollars per gross ton) →		$0.99	.75	.53	.65	.75	.51	.75	.51	.51	.76	.63	.65	.26	1.34	.79	.50	.20	.51	.51	.20	.52	.47	.51	.51	.51	.51	.86	.82	.82	.82	.82	.82
Basing Points →		Pittsburgh	Johnstown	Brackenridge	Butler	Midland	Monessen	Sharon	Youngstown	Canton	Steubenville	Warren	Weirton	Cleveland	Buffalo	Cincinnati	Middletown	Chicago	Claymont	Coatesville	Conshohocken	Harrisburg	Phoenixville	Sparrows Pt.	Bethlehem	Ashland, Ky.	Kokomo, Ind.	Portsmouth, O.	St. Louis	Detroit	Duluth	Kansas City	Birmingham	Alabama City	Atlanta	Minnequa	Houston	Los Angeles	Pittsburg, Calif.	Portland, Ore.	San Francisco	Seattle
GRADES	OPS No.																																								
No. 1 bundles	1	$44.00		$44.00		$43.00		$42.50		$42.00		$41.00	$41.15	$40.00	$39.50	$39.00	$38.00	$37.00		$36.00															
No. 1 busheling	2	44.00		44.00		43.00		42.50		42.00		41.00	41.15	40.00	39.50	39.00	38.00	37.00		36.00															
No. 1 heavy melting	3	43.00		43.00		42.00		41.50		41.00		40.00	40.15	39.00	38.50	38.00	37.00	36.00		35.00															
No. 2 heavy melting	4	43.00		43.00		42.00		41.50		41.00		40.00	40.15	39.00	38.50	38.00	37.00	36.00		35.00															
No. 2 bundles	5	43.00		43.00		42.00		41.50		41.00		40.00	40.15	39.00	38.50	38.00	37.00	36.00		35.00															
Machine shop turnings	6	34.00		34.00		33.00		32.50		32.00		31.00	31.15	30.00	29.50	29.00	28.00	27.00		26.00															
Mixed borings and turnings	7	38.00		38.00		37.00		36.50		36.00		35.00	35.15	34.00	33.50	33.00	32.00	31.00		29.00															
Shoveling turnings	8	38.00		38.00		37.00		36.50		36.00		35.00	35.15	34.00	33.50	33.00	32.00	31.00		29.00															
Cast iron borings	10	38.00		38.00		37.00		36.50		36.00		35.00	35.15	34.00	33.50	33.00	32.00	31.00		29.00															
No. 1 chemical borings	26	41.00		41.00		40.00		39.50		39.00		38.00	38.15	37.00	36.50	36.00	35.00	34.00		32.00															
Forge crops	11	51.50		51.50		50.50		50.00		49.50		48.50	48.65	47.50	47.00	46.50	45.50	44.50		42.50															
Bar crops and plate	12	49.00		49.00		48.00		47.50		47.00		46.00	46.15	45.00	44.50	44.00	43.00	42.00		40.00															
Punchings and plate	14	46.50		46.50		45.50		45.00		44.50		43.50	43.65	42.50	42.00	41.50	40.50	39.50		37.50															
Electric furnace bundles	15	46.00		46.00		45.00		44.50		44.00		43.00	43.15	42.00	41.50	41.00	40.00	39.00		37.00															
Cut const., plate, 3 ft and less	16	47.00		47.00		46.00		45.50		45.00		44.00	44.15	43.00	42.50	42.50	41.00	40.00		38.00															
Cut struc., plate, 2 ft and less	17	49.00		49.00		48.00		47.50		47.00		46.00	46.15	45.00	44.50	44.00	43.00	42.00		40.00															
Cut struc., 1 ft and less	18	50.00		50.00		49.00		48.50		48.00		47.00	47.15	46.00	45.50	45.00	44.00	43.00		41.00															
Foundry steel, 2 ft and less	20	44.00		44.00		43.00		42.50		42.00		41.00	41.15	40.00	39.50	39.00	38.00	37.00		36.00															
Foundry steel, 1 ft and less	21	46.00		46.00		45.00		44.50		44.00		43.00	43.15	42.00	41.50	41.00	40.00	39.00		37.00															
Heavy trimmings	24	43.00		43.00		42.00		41.50		41.00		40.00	40.15	39.00	38.50	38.00	37.00	36.00		34.00															
No. 1 RR heavy melting	RR 1	46.00		46.00		45.00		44.50		44.00		43.00	43.15	42.00	41.50	41.00	40.00	39.00		37.00															
Scrap rails, random lengths	RR 14	48.00		48.00		47.00		46.50		46.00		45.00	45.15	44.00	43.50	43.00	42.00	41.00		39.00															
Scrap rails, 3 ft and less	RR 16	51.00		51.00		50.00		49.50		49.00		48.00	48.15	47.00	46.50	46.00	45.00	44.00		42.00															
Scrap rails, 2 ft and less	RR 17	52.00		52.00		51.00		50.50		50.00		49.00	49.15	48.00	47.50	47.00	46.00	45.00		43.00															
Scrap rails, 18 in. and less	RR 18	54.00		54.00		53.00		52.50		52.00		51.00	51.15	50.00	49.50	49.00	48.00	47.00		46.00															
Rerolling rails	RR 15	53.00		53.00		52.00		51.50		51.00		50.00	50.15	49.00	48.50	48.00	47.00	46.00		44.00															
Uncut tires	RR 20	48.00		48.00		47.00		46.50		46.00		45.00	45.15	44.00	43.50	43.00	42.00	41.00		39.00															
Cut tires	RR 21	51.00		51.00		50.00		49.50		49.00		48.00	48.15	47.00	46.50	46.00	45.00	44.00		42.00															
Cut bolsters and side frames	RR 23	49.00		49.00		48.00		47.50		47.00		46.00	46.15	45.00	44.50	44.00	43.00	42.00		40.00															
RR specialties	RR 24, 28, 29	51.00		51.00		50.00		49.50		49.00		48.00	48.15	47.00	46.50	46.00	45.00	44.00		42.00															
Solid steel axles	RR 25	58.00		58.00		57.00		56.50		56.00		55.00	55.15	54.00	53.50	53.00	52.00	51.00		49.00															
No. 3 steel wheels	RR 27	51.00		51.00		50.00		49.50		49.00		48.00	48.15	47.00	46.50	46.00	45.00	44.00		42.00															
Unassorted	RR 35	40.00		40.00		39.00		38.50		38.00		37.00	37.15	36.00	35.50	35.00	34.00	33.00		31.00															

Cast Scrap Ceilings

Prices set by CPR 5, OPS

(F.o.b. all shipping points)

Grades	OPS No.	
Cupola cast	1	$49.00
Charging box cast	2	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks	8	43.00
Cast iron carwheels	9	47.00
Malleable	10	55.00
Drop broken mach'y cast	11	52.00

Ceiling price of clean cast iron foundry runout or prepared cupola drops is 75 pct of corresponding grade.

Pittsburgh

Machine shop turn.	$32.00
Mixed bor. and ms. turns.	32.00
Shoveling turnings	$36.00 to 36.50
Cast iron borings	35.00 to 35.50
No. 1 machinery cast	52.00
Heavy breakable cast	45.00
Malleable	55.00

Chicago

Low phos. forge crops	$50.00 to 51.00
Low phos. 3 ft and under	44.00 to 45.00
No. 1 machinery cast	47.50 to 48.50
Cupola cast	45.00 to 46.00
Heavy breakable cast	40.50 to 41.50
Malleable	53.00 to 55.00
Stove plate	42.00 to 43.00

Philadelphia Area

Clean cast chem. borings	$36.50 to 37.00
Cupola cast	45.00 to 47.00
Heavy breakable cast	44.00 to 45.00
Unstripped motor blocks	41.00 to 42.00
Charging box cast	44.00 to 45.00

Cleveland

Machine shop turn	$30.00
Mixed bor. and turn	30.00
Shoveling turnings	$34.00 to 34.50
Cast iron borings	34.00 to 34.50
No. 1 machinery cast	48.50 to 49.50
Stove plate	45.00 to 46.00
Malleable	51.00 to 52.00

Youngstown

Machine shop turn	$31.00
Shoveling turnings	$35.00 to 35.50
Cast iron borings	35.00 to 35.50

Buffalo

No. 1 machinery cast	$46.00 to 47.00
No. 1 cupola cast	44.00 to 45.00

Birmingham

Shoveling turnings	$29.00 to 31.00
Cast iron borings	29.00 to 31.00
No. 1 cupola cast	44.00 to 45.00
Stove plate	40.00 to 41.00
Charging box cast	39.00 to 40.00
Heavy breakable	37.00 to 38.00
Drop broken machinery	44.00 to 45.00
Unstripped motor blocks	37.00 to 38.00

St. Louis

Unstripped motor blocks	$35.00

New York

Brokers' Buying prices per gross ton, on cars:

Clean cast chem. borings	$30.00 to 30.50
No. 1 machinery cast	49.00 to 50.00
Mixed yard cast	43.00 to 44.00
Charging box cast	42.00 to 43.00
Heavy breakable cast	41.00 to 42.00
Unstrp. motor blocks	37.00 to 38.00

Boston

Brokers' Buying prices per gross ton, on cars:

Mixed cupola casting	$38.00 to 39.00
Heavy breakable cast	38.00 to 39.00
Stove plate	36.00 to 37.00

Detroit

Brokers' Buying prices per gross ton, on cars:

No. 1 cupola cast	$48.00
Heavy breakable cast	$43.00 to 44.00
Stove plate	43.00 to 44.00
Cast iron brake shoes	39.00 to 40.00

Cincinnati

No. 1 cupola cast	$48.00 to 49.00
Hvy. breakable cast	41.00 to 42.00
Drop broken cast	51.00 to 52.00

San Francisco

No. 2 bundles	$29.00
Machine shop turn	20.00
No. 1 cupola cast	46.00

Los Angeles

No. 2 bundles	$29.00
Mach. shop turn	20.00
No. 1 cupola cast	50.00

Seattle

No. 2 bundles	$29.00
No. 1 cupola cast	40.50
Heavy breakable	35.50

Hamilton, Ont.

No. 1 hvy. belting	$35.00
No. 1 bundles	35.00
No. 2 bundles	34.50
Mechanical bundles	33.00
Mixed steel scrap	31.00
Mixed bor. and turn.	32.00
Rails, remelting	35.00
Rails, rerolling	33.00
Bushelings	30.00
Bush. new fact. prep'd.	33.00
Bush., new fact. unprep'd	32.00
Short steel turnings	32.00
Cast scrap	50.00

armor

for 1812's war ships

John Stevens, of Hoboken, N. J., is universally credited with the idea of applying armor to the sides of war vessels. Early in the War of 1812, he designed a ship with the battery protected by inclined armor, and submitted his plans to the United States Government.

For 1952's ships, planes, tanks and artillery more and heavier armor is imperative. A constantly maintained supply of steel is demanded for defense —as well as for the numerous needs of civilian economy. This year—36,000,000 tons of scrap are required.

For the purchase or sale of iron or steel scrap . . .

phone or write "Your Chicago Broker"

M. S. KAPLAN COMPANY

231 S. La Salle St., Chicago

Telephone ANdover 3-3900

Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Aug. 19* 1952	Aug. 12, 1952	July 22, 1952	Aug. 21, 1951
Hot-rolled sheets	3.775	3.60	3.60	3.60
Cold-rolled sheets	4.575	4.35	4.35	4.35
Galvanized sheets (10 ga)	5.075	4.80	4.80	4.80
Hot-rolled strip	3.725	3.50	3.50	3.50
Cold-rolled strip	5.20	4.75	4.75	4.75
Plate	3.90	3.70	3.70	3.70
Plates wrought iron	7.85†	7.85	7.85	7.85
Stains C-R strip (No. 302)	36.75†	36.75	36.75	36.75
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb.) cokes	$8.95	$8.70	$8.70	$8.70
Tinplate, electro (0.50 lb.)	7.65	7.40	7.40	7.40
Special coated mfg. ternes	7.75	7.50	7.50	7.50
Bars and Shapes: (cents per pound)				
Merchant bars	3.95	3.70	3.70	3.70
Cold finished bars	4.925	4.55	4.55	4.55
Alloy bars	4.675	4.30	4.30	4.30
Structural shapes	3.85	3.65	3.65	3.65
Stainless bars (No. 302)	31.50†	31.50	31.50	31.50
Wrought iron bars	9.50†	9.50	9.50	9.50
Wire (cents per pound)				
Bright wire	5.225	4.85	4.85	4.85
Rails (dollars per 100 lb)				
Heavy rails	$3.775	$3.60	$3.60	$3.60
Light rails	4.25	4.00	4.00	4.00
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$59.00	$56.00	$56.00	$56.00
Slabs, rerolling	59.00	56.00	56.00	56.00
Forging billets	70.50	66.00	66.00	66.00
Alloy blooms, billets, slabs	76.00	70.00	70.00	70.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.325	4.10	4.10	4.10
Skelp	3.55	3.35	3.35	3.35

* Tentative † Add 4.7 pct.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron: (per gross ton)	Aug. 19, 1952	Aug. 12, 1952	July 22, 1952	Aug. 21, 1951
Foundry, del'd Phila.	$58.19	$58.19	$58.19	$57.77
Foundry, Valley	52.50	52.50	52.50	52.50
Foundry, Southern, Cin'ti	55.58	55.58	55.58	55.58
Foundry, Birmingham	48.88	48.88	48.88	48.88
Foundry, Chicago†	52.50	52.50	52.50	52.50
Basic, del'd Philadelphia	57.27	57.27	57.27	56.92
Basic, Valley furnace	52.00	52.00	52.00	52.00
Malleable, Chicago†	52.50	52.50	52.50	52.50
Malleable, Valley	52.50	52.50	52.50	52.50
Charcoal, Chicago	70.56	70.56	70.56	70.56
Ferromanganese‡	226.25	226.25	186.25	186.25

†The switching charges for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy pages.

Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$43.00*	$43.00*	$41.75	$44.00*
No. 1 steel, Phila. area	41.50*	41.50*	40.50	42.50*
No. 1 steel, Chicago	41.50*	41.50*	40.00	42.50*
No. 1 bundles, Detroit	41.15*	41.15*	41.15*	41.15*
Low phos. Young'n	46.50*	46.50*	46.50*	46.50*
No. 1 cast, Pittsburgh	49.00	46.75	42.00	49.00†
No. 1 cast, Philadelphia	*46.00*	47.50	39.50	49.00†
No. 1 cast, Chicago	45.50	45.50	39.50	49.00†

*Basing pt., not including broker's fee.
†Shipping pt., not including broker's fee.

Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75	$14.75	$14.75	$14.75
Foundry coke, prompt	17.75	17.75	17.75	17.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	24.50
Copper, Lake, Conn.	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.215	$1.215	$1.215	$1.03
Zinc, East St. Louis	14.00	13.75*	15.00	17.50
Lead, St. Louis	15.80	15.80	15.80	16.80
Aluminum, virgin	20.00	20.00	19.00	19.00
Nickel, electrolytic	59.58	59.58	59.58	59.58
Magnesium, ingot	24.50	24.50	24.50	24.50
Antimony, Laredo, Tex.	39.00	39.00	39.00	42.00

* Revised

Composite Prices

[Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)]

Finished Steel Base Price

Aug. 19, 1952.....4.376¢ per lb.*
One week ago.....4.131¢ per lb.
One month ago.....4.131¢ per lb.
One year ago.....4.131¢ per lb.

	High	Low
1952	4.131¢ Jan. 1	4.131¢ Jan. 1
1951	4.131¢ Jan. 2	4.131¢ Jan. 2
1950	4.131¢ Dec. 1	3.837¢ Jan. 3
1949	3.837¢ Dec. 27	3.705¢ May 3
1948	3.721¢ July 27	3.193¢ Jan. 1
1947	3.193¢ July 29	2.848¢ Jan. 1
1946	2.848¢ Dec. 31	2.464¢ Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1
1944	2.396¢	2.396¢
1943	2.396¢	2.396¢
1942	2.396¢	2.396¢
1941	2.396¢	2.396¢
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939	2.35367¢ Jan. 3	2.27207¢ May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

* Tentative

Pig Iron

....$52.77 per gross ton....
.... 52.77 per gross ton....
.... 52.77 per gross ton....
.... 52.69 per gross ton....

High	Low
$52.77 May 2	$52.72 Jan. 1
52.72 Oct. 9	52.69 Jan. 2
52.69 Dec. 12	45.88 Jan. 3
46.87 Jan. 18	45.88 Sept. 6
46.91 Oct. 12	39.58 Jan. 6
37.98 Dec. 30	30.14 Jan. 7
30.14 Dec. 10	25.37 Jan. 1
25.37 Oct. 23	23.61 Jan. 2
$23.61	$23.61
23.61	23.61
23.61	23.61
$23.61 Mar. 20	$23.45 Jan. 2
23.45 Dec. 23	22.61 Jan. 2
22.61 Sept. 19	20.61 Sept. 12
23.25 June 21	19.61 July 6
32.25 Mar. 9	20.25 Feb. 16
19.74 Nov. 24	18.73 Aug. 11

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Scrap Steel

.....$42.00 per gross ton.....
..... 42.00 per gross ton.....
..... 40.75 per gross ton.....
..... 43.00 per gross ton.....

High	Low
$42.00 Jan. 1	$39.17 July 1
47.75 Jan. 30	42.00 Oct. 23
45.13 Dec. 19	26.25 Jan. 3
43.00 Jan. 4	19.33 June 28
43.16 July 27	39.75 Mar. 9
42.58 Oct. 28	29.50 May 20
31.17 Dec. 24	19.17 Jan. 1
19.17 Jan. 2	18.92 May 22
19.17 Jan. 11	15.76 Oct. 24
$19.17	$19.17
19.17	19.17
$22.00 Jan. 7	$18.92 May 22
21.83 Dec. 30	16.04 Apr. 9
22.50 Oct. 3	14.08 May 16
15.00 Nov. 22	11.00 June 7
21.92 Mar. 30	12.67 June 9
17.75 Dec. 21	12.67 June 8

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

***SPECIALIZATION* GIVES YOU UNIFORM HIGH QUALITY IN**

GLOBE ALLOY STEEL TUBES

When you specify GLOBE you get the finest, because Globe *specializes* in the production of steel tubes. For more than thirty years Globe *specialized* research, engineering and manufacturing facilities have assured customers of uniform high quality in alloy steel tubes for pressure or mechanical applications.

GLOBE STEEL TUBES CO., Milwaukee 46, Wis.

Chicago • Cleveland • Detroit • New York • Houston • St. Louis
Denver • San Francisco • Glendale, Cal. • Philadelphia

Producers of Globe seamless stainless steel tubes — Gloweld welded stainless steel tubes — alloy — carbon — seamless steel tubes — Globeiron (high purity ingot iron) seamless tubes — Globe Welding Fittings.

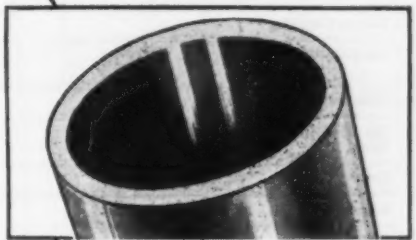
TYPICAL ANALYSES:

Carbon Moly.
1-¼ Chrome ½ Moly • 1-¾ Chrome ¾ Moly
2 Chrome ½ Moly • 2-¼ Chrome 1 Moly
5 Chrome ½ Moly • 7 Chrome ½ Moly
9 Chrome 1 Moly
A1S1 1335 • A1S1 2317 • A1S1 2512 • A1S1 4130, 4140 • A1S1 4615 • A1S1 8615, 8620, 8630, 8635, 8640 • 7% Ni. • 9% Ni.

TYPICAL APPLICATIONS

Pressure Tubes — Superheater Tubes — Condenser Tubes — Still Tubes — Evaporator Tubes — Barrel Tubes — Oil-Well Pump Barrels — Mechanical Tubes — Aircraft Tubes—Rollers for Transmission Chains

GLOBE SEAMLESS TUBES FOR MAXIMUM STRENGTH AND MINIMUM WEIGHT



Pierced from solid steel billets . . . with no seams or welds, Globe seamless tubes are available in many sizes and wall thicknesses for exacting applications.

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply. Does not reflect changes made this week (See page 60).

		INGOTS		BILLETS, BLOOMS, SLABS			PIPE SKELP	PIL-ING	SHAPES STRUCTURALS		STRIP			
		Carbon Forging Net Ton	Alloy Net Ton	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Steel Sheet	Carbon	Hi Str. Low Alloy	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy
EAST	Bethlehem, Pa.					$70.00 *B3*			3.70 *B3*	5.50 *B3*				
	Buffalo, N. Y.			$56.00 *B3*	$66.00 *B3, R3*	$70.00 *B3, R3*		4.45 *B3*	3.70 *B3*	5.50 *B3*	3.50 *B3, R3*	4.65 *B3*	4.95 *B3*	6.40 *B3*
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.				$73.00 *A2*	$77.00 *A2*					3.90 *A2*		5.55 *A2*	
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.			$56.00 *B3*	$66.00 *B3*	$70.00 *B3*			3.70 *B3*	5.50 *B3*	3.50 *B3*			
	Newark, N. J.													
	New Haven, Conn.											5.15 *A5* 5.85 *D1*		
	Phoenixville, Pa.								5.90 *P2*					
	Putnam, Conn.													
	Sparrows Pt., Md.										3.50 *B3*	4.65 *B3*	4.95 *A5, B3*	6.40 *B3*
	Worcester, Mass.													
	Trenton, N. J.											6.00 *R4*		
MIDDLE WEST	Alton, Ill.										3.95 *L1*			
	Ashland, Ky.										3.50 *A7*			
	Canton-Massillon, Ohio				$66.00 *R3*	$70.00 *R3* $66.00 *T5*								
	Chicago, Ill.			$56.00 *U1*	$66.00 *U1, R3,W8*	$70.00 *U1, R3,W8*		4.45 *U1*	3.65 *U1, W8*	5.50 *U1*	3.50 *A1, W8*	4.90 *A1, I3*		
	Cleveland, Ohio				$66.00 *R3*							4.65 *A5, J3*		6.55 *A5* 6.70 *J3*
	Detroit, Mich.		$54.00 *R5*		$69.00 *R5*	$73.00 *R5*					4.40 *M2* 3.80 *G3*	4.85 *G3* 5.45 *M2* 5.60 *R5, D1, D2*	5.95 *G3*	
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana			$56.00 *U1*	$66.00 *U1*	$70.00 *U1, Y1*		4.45 *I3*	3.65 *U1, I3*	5.50 *U1, I3* 6.00 *Y1*	3.50 *U1, Y1,I3*	4.90 *I3*	5.30 *U1, I3* 5.80 *Y1*	
	Granite City, Ill.													
	Kokomo, Ind.													
	Middletown Ohio											4.65 *A7*		
	Niles, Ohio Sharon, Pa.										4.00 *S1*	5.35 *S1*	5.40 *S1*	6.55 *S1*
	Pittsburgh, Pa.	$52.00 *U1*	$54.00 *U1, C11*	$56.00 *U1*	$66.00 *U1*	$70.00 *U1, C11*	3.35 *U1* 3.45 *J3*	4.45 *U1*	3.65 *U1, J3*	5.50 *U1, J3*	4.00 *S9,S7* 3.75 *A3* 3.50 *J3,A7*	4.65 *J3,A7* 5.00 *A3* 5.35 *B4,S7*		
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.								3.90 *W3*		3.60 *W3*	4.65 *W3,F3*	5.75 *W3*	7.20 *W3*
	Youngstown, Ohio					$70.00 *Y1, C10*	3.35 *U1, R3*			6.00 *Y1*	3.50 *U1, R3, Y1*	4.65 *R3, Y1* 5.25 *C5,T4* 5.35 *B4*	5.30 *U1, R3* 5.80 *Y1*	6.55 *R3* 7.05 *Y1*
WEST	Fontana, Cal.	$79.00 *K1*	$80.00 *K1*	$75.00 *K1*	$85.00 *K1*	$89.00 *K1*			4.25 *K1*	6.10 *K1*	4.75 *K1*	6.30 *K1*	6.20 *K1*	8.05 *K1*
	Geneva, Utah				$66.00 *C7*				3.65 *C7*	5.50 *C7*				
	Kansas City, Mo.								4.25 *S2*		4.10 *S2*			
	Los Angeles, Calif.				$85.00 *B2*	$90.00 *B2*			4.25 *B2, C7*	6.05 *B2*	4.25 *B2,C7*	6.40 *C7*	6.05 *B2*	
	Minnequa, Colo.								4.10 *C6*		4.55 *C6*			
	San Francisco, Cal. Niles, Cal.				$85.00 *B2*				4.20 *B2* 4.56 *P9*	6.00 *B2*	4.25 *C7,B2*		6.05 *B2*	
	Seattle, Wash.	$73.00 *S11*			$85.00 *B2*				4.30 *B2*	6.10 *B2*	4.50 *B2*		6.30 *B2*	
SOUTH	Atlanta, Ga.										4.05 *A8*			
	Birmingham, Ala. Alabama City, Ala.			$56.00 *T2*	$66.00 *T2*				3.65 *R3, T2*	5.50 *T2*	3.50 *R3, T2*		5.30 *T2*	
	Houston, Texas		$62.00 *S2*		$74.00 *S2*	$78.00 *S2*			4.05 *S2*		3.90 *S2*			

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply. Does not reflect changes made this week (See page 60).

STEEL PRICES

SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE	
Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Coke* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.	
													Bethlehem, Pa.
3.60 *B3*	4.35 *B3*				5.40 *B3*	6.55 *B3*			4.10 *W6*				Buffalo, N. Y.
										† Special coated mfg ternes deduct 35¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb coke base box. * COKES: 1.50-lb, add 25¢. ELECTRO: 0.50-lb, add 25¢; 0.75-lb, add 65¢.			Claymont, Del.
													Coatesville, Pa.
4.00 *A2*					5.65 *A2*								Conshohocken, Pa.
													Harrisburg, Pa.
													Hartford, Conn.
									4.10 *B3*				Johnstown, Pa.
													Newark, N. J.
													New Haven, Conn.
													Phoenixville, Pa.
													Putnam, Conn.
3.60 *B3*	4.35 *B3*	4.80 *B3*			5.40 *B3*	6.55 *B3*	6.75 *B3*		4.20 *B3*	$8.55 *B3*	$7.25 *B3*		Sparrows Pt., Md.
									4.40 *A5*				Worcester, Mass.
									4.20 *R4*				Trenton, N. J.
									4.40 *L1*				Alton, Ill.
3.60 *A7*		4.80 *A7*	4.65 *A7*										Ashland, Ky.
		4.80 *R3*											Canton-Massillon, Ohio
3.60 *W8*					5.40 *U1*				4.10 *A5,R3, N4*				Chicago, Ill.
3.60 *R3,J3*	4.35 *R3,J3*		4.65 *R3*		5.40 *R3,J3*	6.55 *R3,J3*			4.10 *A5*				Cleveland, Ohio
3.80 *G3* 4.40 *M3*	4.55 *G3*				5.95 *G3*	7.10 *G3*							Detroit, Mich.
													Duluth, Minn.
3.60 *U1, Y1,I3*	4.35 *U1, Y1,I3*	4.80 *U1,I3*	4.65 *U1,I3*	5.20 *U1*	5.40 *U1,I3* 5.90 *Y1*	6.55 *U1,I3* 7.05 *Y1*		5.40 *I3*	4.10 *Y1*	$8.45 *I3, U1, Y1*	$7.15 *U1,I3*	5.85 *U1* 5.30 *Y1*	Gary, Ind. Harbor, Indiana
4.30 *G2*	5.05 *G2*	5.50 *G2*	5.35 *G2*								$7.35 *G2*	6.05 *G2*	Granite City, Ill.
		5.20 *C9*											Kokomo, Ind.
	4.35 *A7*		4.65 *A7*	5.20 *A7*									Middletown, Ohio
5.25 *N3* 4.00 *S1*		6.00 *N3*		6.00 *N3*	5.40 *S1*								Niles, Ohio Sharon, Pa.
3.60 *U1, J3,A7* 3.75 *A3*	4.35 *U1, J3,A7*	4.80 *U1*	4.65 *U1*		5.40 *U1,J3*	6.55 *U1,J3*	7.20 *U1*		4.10 *A5* 4.30 *P6*	$8.45 *U1,J3*	$7.15 *U1,J3*	5.85 *U1*	Pittsburgh, Pa.
									4.30 *P7*				Portsmouth, Ohio
3.60 *W3,W5*	5.35 *F3* 4.35 *W3,W5*	4.80 *W3,W5*		5.20 *W3,W5*	5.75 *W3*	6.90 *W3*				$8.45 *W3,W5*	$7.15 *W3,W5*	6.15 *W5* 5.85 *F3*	Weirton, Wheeling, Follansbee, W. Va.
3.60 *U1, R3, Y1*	4.35 *R3, Y1*	5.50 *R1*	4.65 *Y1*	6.05 *E2*	5.40 *U1,R3* 5.90 *Y1*	6.55 *R3* 7.05 *Y1*		6.05 *R1,E2*	4.10 *Y1*	$8.45 *R3*	$7.15 *R3*		Youngstown, Ohio
4.55 *K1*	5.30 *K1*				6.35 *K1*	7.50 *K1*			4.90 *K1*				Fontana, Cal.
3.70 *C7*													Geneva, Utah
													Kansas City, Mo.
4.30 *C7*		5.55 *C7*						5.40 *C7*	4.90 *B2,C7*	$9.20 *C7*	$7.90 *C7*		Los Angeles, Cal.
									4.35 *C6*				Minnequa, Colo.
4.30 *C7*	5.30 *C7*	5.55 *C7*											San Francisco, Cal. Niles, Cal.
													Seattle, Wash.
													Atlanta, Ga.
3.60 *R3,T2*	4.35 *T2*	4.80 *R3,T2*			5.40 *T2*			4.75 *R3*	4.10 *R3,T2*	$8.55 *T2*	$7.25 *T2*		Birmingham, Ala. Alabama City, Ala.
									4.50 *S2*				Houston, Texas

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply. Does not reflect changes made this week (See page 60).

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg'n. Bright
EAST	Bethlehem, Pa.				4.30 *B3*	5.40 *B3*	5.55 *B3*					
	Buffalo, N. Y.	3.70 *B3,R3*	3.70 *B3,R3*	4.60 *B5*	4.40 *B3,R3*	5.40 *B3*	5.55 *B3*	3.70 *B3*				4.85 *W6*
	Claymont, Del.							4.15 *C4*		4.85 *C4*		
	Coatesville, Pa.							4.15 *L4*		5.25 *L4*		
	Conshohocken, Pa.							4.15 *A2*	4.75 *A2*	5.05 *A2*	5.90 *A2*	
	Harrisburg, Pa.							6.30 *C3*	6.30 *C3*			
	Hartford, Conn.			5.10 *R3*		5.85 *R3*						
	Johnstown, Pa.	3.70 *B3*	3.70 *B3*		4.30 *B3*		5.55 *B3*	3.70 *B3*		4.75 *B3*	5.65 *B3*	4.85 *B3*
	Newark, N. J.			5.00 *W10*		5.75 *W10*						
	New Haven, Conn.											
	Phoenixville, Pa.											
	Putnam, Conn.			5.10 *W10*								
	Sparrows Point, Md.		3.70 *B3*					3.70 *B3*		4.75 *B3*	5.65 *B3*	4.85 *B3*
	Worcester, Mass.					5.75 *A5*						5.15 *A5,W6*
	Trenton, N. J.											
MIDDLE WEST	Alton Ill.	4.15 *L1*										5.05 *L1*
	Ashland, Ky.							3.70 *A7*				
	Canton-Massillon	3.70 *R3*		4.55 *R3,R2*	3.95 *T5* 4.30 *R3*	4.90 *T5* 5.40 *R3,R2*						
	Chicago, Ill.	3.70 *U1,R3, W8*	3.70 *R3*	4.55 *A5,B5, W8,W1*	4.30 *U1,R3 W8*	5.40 *R3,W8 W10,B5,L2* 5.45 *A5*		3.70 *U1,W8*	4.75 *U1*	4.75 *U1*	5.65 *U1*	5.10 *W7* 4.85 *R3,A5, K2,N4*
	Cleveland, Ohio	3.70 *R3*	3.70 *R3*	4.55 *A5,C13*		5.45 *A5*	5.55 *R3,J3*	3.70 *R3,J3*	4.75 *J3*		5.65 *R3,J3*	4.85 *A5,C13*
	Detroit, Mich.	3.85 *R5*		4.70 *P8,R5* 4.80 *P3*	4.45 *R5* 4.65 *G3*	5.50 *R5* 5.55 *P8* 5.60 *P3*						
	Duluth, Minn.											4.85 *A5*
	Gary, Ind. Harbor, Indiana	3.70 *U1, Y1, I3*	3.70 *U1,I3, Y1*	4.55 *R3,M5, L2*	4.30 *U1,I3, Y1*	5.40 *R3,M5, L2*	5.55 *U1,I3* 6.05 *Y1*	3.70 *U1,I3, Y1*	4.75 *I3*	4.75 *U1*	5.65 *U1,I3* 6.15 *Y1*	5.10 *M4*
	Granite City, Ill.							4.40 *G2*				
	Kokomo, Ind.											4.95 *C9*
	Middletown, Ohio											
	Niles, Ohio Sharon, Pa.							3.95 *S1*		5.20 *S1*	5.70 *S1*	
	Pittsburgh, Pa.	3.70 *U1,J3*	3.70 *U1,J3*	4.55 *R3,A5, J3,S8,W10, C8*	4.30 *U1,C11*	5.40 *C11,S8, W10,C8,A5*	5.55 *U1,J3*	3.70 *U1,J3*	4.75 *U1*	4.75 *U1*	5.65 *U1,J3*	4.85 *A5,J3* 5.10 *P6*
	Portsmouth, Ohio											5.25 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	3.85 *W3*						4.00 *W3,W5*				
	Youngstown, Ohio	3.70 *U1,R3, Y1*	3.70 *U1,R3, Y1*	4.55 *Y1,F2*	4.30 *U1, Y1, C10*	5.40 *Y1,C10, F2*	5.55 *U1* 6.05 *Y1*	3.70 *U1,R3, Y1*			5.65 *R3* 6.15 *Y1*	4.85 *Y1*
WEST	Fontana, Cal.	4.40 *K1*	4.40 *K1*		5.35 *K1*		6.60 *K1*	4.30 *K1*		5.70 *K1*	6.25 *K1*	
	Geneva, Utah							3.70 *C7*			5.65 *C7*	
	Kansas City, Mo.	4.30 *S2*	4.30 *S2*		4.90 *S2*							5.45 *S2*
	Los Angeles, Cal.	4.40 *C7,B2*	4.40 *C7,B2*		5.35 *B2*		6.25 *B2*					5.80 *C7,B2*
	Minnequa, Colo.	4.15 *C6*	4.50 *C6*					4.50 *C6*				5.10 *C6*
	San Francisco, Cal. Niles Cal.	4.45 *B2* 4.40 *C7* 4.65 *P9*	4.45 *B2* 4.40 *C7* 4.65 *P9*				6.30 *B2*					5.80 *C7*
	Seattle, Wash.	4.45 *B2*	4.45 *B2*				6.30 *B2*	4.60 *B2*			6.55 *B2*	
SOUTH	Atlanta, Ga.	4.25 *A8*	4.25 *A8*									5.10 *A8*
	Birmingham, Ala. Alabama City, Ala.	3.70 *R3,T2*	3.70 *R3,T2*				5.55 *T2*	3.70 *R3,T2*			5.65 *T2*	4.85 *R3,T2*
	Houston, Tex.	4.10 *S2*	4.10 *S2*		4.70 *S2*			4.10 *S2*				5.25 *S2*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Allen Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Illes & Laughlin Inc., Harvey, Ill.

C1 California Cold Rolled Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Steel Corp., Claymont, Del.
C5 Cold Metal Products Co., Youngstown
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia-Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Glassport, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Judson Mfg. & Supply Co., Chicago

K1 Kaiser Corp., Oakland, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Lackawanna Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Co., Pittsburgh
N3 Niles Rolling Mills Co., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.

O1 Oliver Iron & Steel Co., Pittsburgh

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co. (John A.), Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sloss Sheffield Steel & Iron Co., Birmingham
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Sweet's Steel Co., Williamsport, Pa.
S11 Seidelhuber Steel Rolling Mills, Seattle

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal, Iron & R. R. Co., Birmingham
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Steel Co., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.

U1 United States Steel Co., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Co., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh

Y1 Youngstown Sheet & Tube Co., Youngstown

Steel Prices

Base price, f.o.b., dollars per 100 lb.

WAREHOUSES		Sheets			Strip		Plates	Shapes	Bars		Alloy Bars			
Cities	Delivery Charge*	Hot-Rolled	Cold-Rolled (18 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As Rolled	Cold-Drawn A 4140 Annealed
Baltimore	$.20	5.54–6.44	6.84–7.05	8.02	6.07	.....	6.17	6.17	6.05	6.67	.....	.....	.....	.....
Birmingham	.15	5.59	6.37	7.20–7.35[1]	5.54	.....	5.85	5.70	5.52	7.60	.....	.....	.....	.....
Boston	.20	6.25	7.03	8.19–8.28	6.20	7.74–8.70	6.35–6.63	6.25	6.10–6.14	6.64–6.92	10.25–10.30	10.55–10.63	11.95	12.15–12.28
Buffalo	.20	5.50–5.54	6.28–6.32	8.06–8.20	5.86	.....	5.89–5.98	5.80–5.82	5.52–5.55	6.18–6.45	10.15	10.45–10.52	11.80	12.10–12.17
Chicago	.20	5.54	6.32	7.65	5.49	.....	5.65–5.70	5.65	5.47	6.05–6.30	.....	10.10	.....	11.75
Cincinnati	.15	5.87	6.39	8.12	5.79	.....	6.17	6.12	5.77	6.66	.....	10.52	.....	12.22
Cleveland	.20	5.52–5.54	6.32	7.76–7.79	5.65–5.88	.....	5.82	5.95–6.16	5.61–5.62	6.15–6.40	.....	10.21	.....	11.86
Detroit	.20	5.73–5.74	6.49	7.96–8.19	5.78	.....	6.04–6.17	6.12	5.76	6.00	.....	10.37	.....	12.12
Houston	.20	6.35–6.58	7.37–8.00	8.57	6.15	.....	6.39–6.42	6.32–6.35	6.38	8.38–8.63	10.95	11.12–11.25	11.40	12.62–12.90
Indianapolis	del'd.	5.94	6.72	8.25	5.80	.....	6.10	6.05	5.87	6.80	.....	10.50	.....	.....
Kansas City	.20	6.22–6.40	7.64–7.68	8.66–8.70	6.10–6.90	7.81	6.38–6.74	6.43–6.48	6.20–6.77	7.01–7.22	10.00	10.10	11.50	11.80
Los Angeles	.20	6.35	8.15–8.45	9.25–10.20	6.40	10.45	6.50	6.30	6.25–6.35	8.15	11.30	11.60	13.05	13.30
Memphis	.10	6.25	7.03	7.51	6.20	.....	6.36	6.36–6.61	6.33–6.57	7.11	.....	.....	.....	.....
Milwaukee	.20	5.71	6.48	7.81–7.82	5.66	.....	5.81–5.87	5.82	5.64	6.31–6.57	.....	10.17	.....	.....
New Orleans	.15	5.98	7.01	8.26	5.93	.....	6.09	6.09	5.91	7.02	.....	.....	.....	.....
New York	.30	6.09–6.52	6.90–7.08	8.07–8.28	6.36–7.19	7.67	6.47–6.88	6.39–6.40	6.22–6.42	7.03–7.58	10.45	10.49–10.75	12.10	12.14–12.40
Norfolk	.20	6.68	.....	.....	6.33	.....	6.20	6.20	5.95	7.30	.....	.....	.....	.....
Philadelphia	.25	5.84–6.07	6.80–7.22	7.95–8.00	6.04–6.08	7.15	6.05–6.19	5.86–6.09	6.14–6.27	6.96–7.16	9.82–10.17	10.24–10.47	11.82	11.80–12.12
Pittsburgh	.20	5.54	6.32	7.65–8.05	5.59–5.62	.....	5.65–5.70	5.65	5.47	6.15–6.40	.....	10.10	.....	11.75
Portland	.20	7.25	8.64–9.00	9.10–9.25	7.30	.....	6.76	7.96	7.00	8.65	.....	.....	.....	.....
Salt Lake City	.20	7.95	.....	9.80–10.35	8.00	.....	7.45	7.60	7.95	.....	.....	.....	.....	.....
San Francisco	.15	6.51–6.64	7.88–8.23	9.15–10.20	6.60–6.72	10.45	6.40–6.75	6.42–6.50	6.32–6.52	8.15–8.20	11.30	11.30	13.05	13.50
Seattle	.20	6.96–7.16	8.38–8.98	9.45	7.25–7.55	.....	6.74–6.89	6.32–6.52	6.88–7.08	8.86–8.91	.....	.....	.....	.....
St. Louis	.20	5.84	6.62–7.15	7.95	5.79	7.66–8.15	6.05–6.10	6.05–6.22	5.77–5.80	6.45–6.70	10.08	10.40	11.73	12.05
St. Paul	.15	6.14	6.92	8.31	6.09	.....	6.25	6.25	6.07	6.75	.....	.....	.....	.....

* Metropolitan area delivery.

BASE QUANTITIES (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

EXCEPTIONS: (1) 500 to 1499 lb.

STAINLESS STEELS

Base price, cents per lb, f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	14.25	15.25	16.75	16.25	24.75	20.00	21.75	12.75	14.75	13.00
Slabs, billets, rerolling	18.50	20.00	22.00	21.00	32.25	26.25	28.50	16.50	20.00	16.75
Forg. discs, die blocks, rings	34.00	34.25	36.75	35.75	53.00	40.25	44.75	28.00	28.50	28.50
Billets, forging	26.25	26.50	28.50	27.75	41.50	31.25	35.00	21.50	22.00	22.00
Bars, wires, structurals	31.25	31.50	34.00	33.00	49.25	37.00	41.50	25.75	26.25	26.25
Plates	33.00	33.25	35.25	35.25	52.00	40.75	45.25	27.00	27.50	27.50
Sheets	41.00	41.25	43.25	43.25	57.00	49.25	53.75	36.50	37.00	39.00
Strip, hot-rolled	26.50	28.25	32.50	30.25	48.75	37.00	41.25	23.50	30.25	24.00
Strip, cold-rolled	34.00	36.75	40.25	38.75	59.00	48.25	52.25	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets*: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2*; (type 316 add 4.5¢) *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Lockport, N. Y., *R4*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; (type 316 add 4.5¢); W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Lockport, N. Y., *S4*; Sharon, Pa., *S1* (type 301 add ¼¢); Butler, Pa., *A7*; Wallingford, Conn., *W1*.

Bars: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Lockport, N. Y., *S4*; Canton, O., *T5*; Ft. Wayne, *J4*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3* (type 416 add ½¢); Butler, Pa., *A7*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Lockport, N. Y., *S4*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forging billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*.

ALLEGHENY LUDLUM—Slightly higher on Type 301; slightly lower on others in 300 series.

WASHINGTON STEEL—Slightly lower on 300 series except where noted.

PIPE AND TUBING

Base discounts f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS					
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½-3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	34.0	12.0	37.0	16.0	39.0	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0	....	....	....	....	....	....
Youngstown *R3*	36.0	14.0	39.0	18.0	41.5	21.5	42.9	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	....
Fontana *K1*	25.0	3.0	28.0	7.0	30.5	10.5	31.0	11.0	31.5	12.0	32.0	12.5	32.5	13.0	....	....	....	....	....	....
Pittsburgh *J3*	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5	11.5	34.5	13.5
Pittsburgh *N2*	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
Alton Ill. *L1*	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0	....	....	....	....	....	....
Sharon *M3*	36.0	13.0	39.0	17.0	41.5	20.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0	....	....	....	....	....	....
Pittsburgh *N1*	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	....	32.5	....	34.5	....
Wheeling *W5*	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	....
Wheatland *W4*	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	....	....	....	....	....	....
Youngstown *Y1*	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
Indiana Harbor *Y1*	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0	....	....	....	....	....	....
Lorain *N2*	36.0	19.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
EXTRA STRONG PLAIN ENDS																				
Sparrows Pt. *B3*	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0	....	....	....	....	....	....
Youngstown *R3*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	....
Fontana *K1*	24.5	4.0	28.5	8.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0	....	....	....	....	....	....
Pittsburgh *J3*	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0	36.5	15.5
Pittsburgh *N2*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5
Alton, Ill. *L1*	32.5	12.0	36.5	16.0	38.5	19.5	39.0	20.0	39.5	21.0	40.0	21.5	40.5	22.0	....	....	....	....	....	....
Sharon *M3*	35.5	14.0	39.5	18.0	41.5	21.0	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0	....	....	....	....	....	....
Pittsburgh *N1*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	....	33.0	....	36.5	....
Wheeling *W5*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	....
Wheatland *W4*	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	....	....	....	....	....	....
Youngstown *Y1*	35.5	15.0	39.5	19.0	41.0	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	26.0	29.0	10.0	33.0	14.0	36.5	17.5
Indiana Harbor *Y1*	34.5	14.0	38.5	18.0	40.5	21.0	41.0	22.0	41.5	23.0	42.0	23.5	42.5	24.0	....	....	....	....	....	....
Lorain *N2*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5

Galvanized discounts based on zinc, at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢.

Threads only buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3½ pts. higher discount. Buttweld jobbers' discount, 5 pct. East St. Louis zinc price now 14.0¢.

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$14.50 to $15.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$17.50 to $18.00
Foundry, oven coke	
Buffalo, del'd	$26.58
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, del'd	24.80
Seaboard, N. J., f.o.b.	22.75
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	22.50
St. Louis	25.40
Birmingham, del'd	21.69
Neville Island	23.00

ELECTRICAL SHEETS

22 Ga. H-R cut length F.o.b. Mill Cents Per Lb.	Armature	Elec.	Meter	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech Bottom *W5*	....	7.25	8.50	9.30	9.85	10.40	11.10
Brackenridge *A3*	....	7.25	8.50	9.30	9.85	....	....
Granite City *G2*	....	7.95	9.20	....	....	....	....
Ind. Harbor *I3*	6.75	7.25	....	....	....	....	....
Mansfield *E2*	7.25	7.75	9.00	9.80	....	....	....
Niles, O. *N3*	7.05	7.55	....	....	....	....	....
Vandergrift *U1*	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Warren, O. *R3*	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Zanesville *A7*	6.75	7.25	8.50	9.30	9.85	10.40	11.10

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges

Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	Bl. Furnace Silvery	Low Phos. Charcoal
Bethlehem *B3*	54.00	54.50	55.00	55.50	....	....	....
Birmingham *R3*	48.38	48.88	....	....	....	....	....
Birmingham *W9*	48.38	48.88	....	....	....	....	....
Birmingham *S5*	48.38	48.88	....	....	....	....	....
Buffalo *R3*	52.00	52.50	53.00	....	....	....	....
Buffalo *H1*	52.00	52.50	53.00	....	....	63.75	....
Chicago *I4*	52.00	52.50	52.50	53.00	....	....	....
Cleveland *A5*	52.00	52.50	52.50	53.00	57.00	....	....
Cleveland *R3*	52.00	52.50	52.50	....	....	....	....
Daingerfield, Tex. *L3*	48.00	48.50	48.50	....	....	....	....
Duluth *I4*	52.00	52.50	52.50	53.00	....	....	....
Erie *I4*	52.00	52.50	52.50	53.00	....	....	....
Everett, Mass. *M6*	....	59.75	60.25	....	....	....	....
Fontana *K1*	58.00	58.50	....	....	....	....	....
Geneva, Utah *U1, Y1*	52.00	52.50	52.50	53.00	....	....	....
Granite City, Ill. *K3*	53.90	54.40	54.90	....	....	....	....
Hubbard, Ohio *Y1*	52.00	52.50	52.50	....	....	....	....
Ironton Utah *C7*	52.00	52.50	....	....	....	....	....
Jackson, Ohio *J1, G1*	....	....	....	....	....	62.50	....
Lyle, Tenn. *T3*	....	....	....	....	....	....	66.00
Monessen *P6*	54.00	....	....	....	....	....	....
Neville Island *P4*	52.00	52.50	52.50	53.00	....	....	....
Pittsburgh *U1*	52.00	....	....	53.00	....	....	....
Sharpsville *S3*	52.00	52.50	52.50	53.00	....	....	....
Steelton *B3*	54.00	54.50	55.00	55.50	60.00	....	....
Swedeland *A2*	56.00	56.50	57.00	57.50	....	....	....
Toledo *I4*	52.00	52.50	52.50	53.00	....	....	....
Troy, N. Y. *R3*	54.00	54.50	55.00	....	60.00	....	....
Youngstown *Y1*	52.00	52.50	52.50	53.00	....	....	....
N. Tonawanda, N. Y. *T1*	....	52.50	53.00	....	....	....	....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base, (1.75 to 2.25 pct, except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 pct and over. Silvery Iron: Add $1.50 per net ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	22.67	26.66	21.99	25.86
	2½	12	30.48	35.84	29.57	34.76
	3	12	33.90	39.90	32.89	38.70
	3½	11	42.37	49.89	41.10	48.39
	4	10	52.00	61.88	51.03	60.82
National Tube	2	13	21.62	26.48	....	....
	2½	12	29.65	36.32	....	....
	3	12	34.00	41.64	....	....
	3½	11	40.34	49.41	....	....
	4	10	51.21	62.72	....	....
Pittsburgh Steel	2	13	....	27.08	....	....
	2½	12	30.49	37.15	....	....
	3	12	34.95	42.58	....	....
	3½	11	41.48	50.54	....	....
	4	10	52.65	64.16	....	....

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$105.30 to $108.80
6 to 24-in., del'd N.Y.	108.50 to 109.50
6 to 24-in., Birmingham	91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	$123.00 to $130.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

C-R SPRING STEEL

Cents Per Lb. F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bridgeport, Conn. *S7*	5.35	6.80	7.40	9.35	11.65
Carnegie, Pa. *S9*	....	6.80	7.40	9.35	11.65
Cleveland *A5*	4.65	6.45	7.40	9.35	11.65
Detroit *D1*	5.60	6.65	7.25	....	....
New Castle, Pa. *B4*	5.35	6.80	7.40	9.35	....
New Haven, Conn. *D1*	5.85	6.75	7.35	....	....
Sharon Pa. *S1*	5.35	6.80	7.40	9.35	11.65
Weirton, W. Va. *W3*	5.35	6.80	7.40	9.35	11.65
Worcester, Mass. *A5*	4.95	6.75	7.70	9.65	11.95
Youngstown *C5*	....	6.80	7.40	9.35	11.65

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Base Col.	Woven Wire Fence 9–15½ ga. Base Col.	Fence Posts Base Col.	Single Loop Bale Ties Base Col.	Twisted Barbless Wire Base Col.	Galv. Barbed Wire Base Col.	Merch. Wire Annl'd ¢/lb.	Merch. Wire* Galv. ¢/lb.
Alabama City *R3*	118	126	....	123	....	136	5.70	5.95
Aliquippa, Pa. *J3*	118	132	....	....	136	140	5.70	6.15
Atlanta *A8*	121	133	....	126	126	143	5.95	6.40
Bartonville *K2*	116	130	....	123	143	143	5.70	6.15
Buffalo *W6*	....	....	....	....	....	....	4.85	....
Cleveland *A6*	125	....	....	....	....	....	5.70	6.10
Cleveland *A5*	....	....	....	....	....	....	5.95	6.40
Crawfrdsvl. *M4*	....	132	....	....	....	145	5.95	6.40
Donora, Pa. *A5*	118	130	....	123	140	140	5.70	6.15
Duluth *A5*	118	130	....	123	140	140	5.70	6.15
Fairfield, Ala. *T2*	118	130	....	123	....	140	5.70	6.15
Houston *S2*	126	138	....	....	....	148	6.10	6.55
Johnstn., Pa. *B3*	118	130	....	....	140	....	5.70	6.15
Joliet, Ill. *A5*	118	130	....	123	....	140	5.70	6.15
Kokomo, Ind. *C9*	120	132	....	125	138	142	5.80	6.05
Los Angeles *B2*	....	....	....	....	....	....	6.65	....
Kansas City *S2*	130	....	....	135	....	152	6.30	6.75
Minnequa *C6*	123	138	130	128	146	146	5.95	6.45
Monessen *P6*	124	135	....	....	....	145	5.95	6.40
Moline, Ill. *R3*	....	....	136	....	....	....	....	....
Pittsburg, Cal. *C7*	137	....	....	147	156	160	6.65	6.80
Portsmouth *P7*	124	137	....	....	147	147	6.10	6.60
Rankin Pa. *A5*	118	130	....	....	140	140	5.70	6.15
So. Chicago *R3*	118	126	140	123	....	136	5.70	5.95
S. San Fran. *C6*	....	....	....	147	....	160	6.65	7.10
Sparrows Pt. *B3*	120	....	....	125	142	142	5.80	6.25
Sterling, Ill. *N4*	118	130	....	123	140	140	5.70	6.15
Struthers, O. *Y1*	....	....	....	....	....	....	5.70	6.15
Terrance, Cal. *C7*	138	....	....	....	....	....	6.65	....
Worcester *A5*	124	....	....	....	....	....	6.80	6.65
Williamsport, Pa. *S10*	....	....	150	....	....	....	....	....

Cut Nails, carloads, base $7.35 per 100 lb. (less 20¢ to jobbers), at Conshohocken, Pa., (*A2*), Wheeling, W. Va., (*W5*), $7.15.

* Alabama City and So. Chicago don't include zinc extra

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Nuts, Hot Pressed, Cold Punched—Sq.

Pct Off List

	Less Keg. Reg.	K.	Less Keg. Hvy.	K.
½ in. & smaller	15	28½	15	28½
9/16 in. & ⅝ in.	13	25	6½	21
¾ in. to 1½ in. inclusive	9	23	1	16½
1⅝ in. & larger	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	16½	29½	6½	21
¾ in. to 1½ in. inclusive	13	25	2	17½
1⅝ in. & larger	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	12	25
1⅝ in. & larger	8½	23	2	17½

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller	35	45	28½	29½
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger	13	26	8½	23
	Light			
7/16 in. & smaller	35	45		
½ in. thus ⅝ in.	28½	39½		
¾ in. to 1½ in. inclusive	26	37		

Stove Bolts

Pct Off List

Packaged, steel, plain finished. 48—10
Packaged, plate finish ..... 31—10
Bulk, plain finish** 62*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

Base per 100 lb

½ in. & larger $7.85

Cap and Set Screws

(In bulk) *Pct Off List*

Hexagon head cap screws, coarse or fine thread, ¼ in thru ⅝ in. x 6 in., SAE 1020, bright	54
¾ in. thru 1 in. up to & including 6 in.	48
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	46
¾ in. thru 1 in. up to & including 6 in.	41
Milled studs	35
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

Machine and Carriage Bolts

Pct Off List

	Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in.	14	27½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	....

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	3.60	4.00	4.70	....	....	....	....	....
Chicago *R3*	....	....	....	6.15	....	....	....	....
Cleveland *R3*	....	....	....	....	....	9.35	....	....
Ensley *T2*	3.60	4.00	....	....	....	....	....	....
Fairfield *T2*	....	4.00	4.70	6.15	5.60	....	4.50	9.80
Gary *U1*	3.60	4.00	....	....	....	....	4.50	....
Ind. Harbor *I3*	3.60	....	4.70	6.15	5.60	....	4.50	....
Johnstown *B3*	....	4.00	....	....	5.60	....	....	....
Joliet *U1*	....	4.00	4.70	....	....	....	....	....
Kansas City *S2*	....	....	....	6.40	....	....	....	9.85
Lackawanna *B3*	3.60	4.00	4.70	....	....	....	4.50	....
Lebanon *B3*	....	....	....	6.15	....	9.35	....	9.85
Minnequa *C6*	3.60	4.50	4.70	6.15	....	....	4.50	9.85
Pittsburgh *R3*	....	....	....	....	....	9.35	....	....
Pittsburgh *O1*	....	....	....	....	....	9.35	....	9.85
Pittsburgh *P5*	....	....	....	....	....	....	....	9.85
Pittsburgh *J3*	....	....	....	6.15	....	....	....	....
Pitt'g. Cal. *C7*	....	....	....	....	....	....	4.65	....
Seattle *B2*	....	....	....	6.65	....	....	4.65	....
Steelton *B3*	3.60	....	4.70	....	....	....	4.50	....
Struthers *Y1*	....	....	....	6.15	....	....	....	....
Torrance *C7*	....	....	....	....	....	....	4.65	....
Youngstown *R3*	....	....	....	6.15	....	....	....	....

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.505
18	4	1	—	5	$2.13
18	4	2	—	—	$1.65
1.5	4	1.5	8	—	81.0¢
6	4	2	6	—	96.5¢

High-carbon chromium ..... 63.5¢
Oil hardened manganese ..... 35¢
Special carbon ..... 32.5¢
Extra carbon ..... 27¢
Regular carbon ..... 23¢

Warehouse prices on and east of Mississippi are 3.5¢ per lb. higher. West of Mississippi, 5.5¢ higher.

CLAD STEEL

	Plate	Sheet
Stainless-carbon		
No. 304, 20 pct.		
Coatesville, Pa. *L4*	*29.5	
Washington, Pa. *J2*	*29.5	
Claymont, Del. *C4*	*28.00	
Conshohocken, Pa. *A2*		*27.50
New Castle, Ind. *I2*	*29.77	*26.24
Nickel-carbon		
10 pct Coatesville, Pa. *L4*	32.5	
Inconel-carbon		
10 pct Coatesville, Pa. *L4*	40.5	
Monel-carbon		
10 pct Coatesville, Pa. *L4*	33.5	
No. 302 Stainless-copper stainless, Carnegie, Pa. *A4*		77.00
Aluminized steel sheets, hot dip, Butler, Pa. *A7*		7.75

* Includes annealing and pickling, or sandblasting.

ELECTRODES

Cents per lb, f.o.b., plant threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb.
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2½	24, 30	23.15
2	24, 30	25.36
	CARBON	
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; Effective CaF_2 content:

70% or more $43.00
60% or less 40.00

REFRACTORIES

Fire Clay Brick

Carloads, per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5) $94.60
No. 1 Ohio 88.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 88.00
No. 2 Ohio 79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) 13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala. $94.60
Childs, Pa. 99.00
Hays, Pa. 100.10
Chicago District 104.50
Western Utah and Calif. 111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago 111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) 16.50
Silica cement, net ton, bulk, Hays, Pa. 18.70
Silica cement, net ton, bulk, Ensley, Ala. 17.60
Silica cement, net ton, bulk, Chicago District 17.60
Silica cement, net ton, bulk, Utah and Calif. 24.70

Chrome Brick

Per Net Ton

Standard chemically bonded Balt., Chester $82.00

Magnesite Brick

Standard, Baltimore $104.00
Chemically bonded, Baltimore 93.00

Grain Magnesite

St. ⅝-in. grains

Domestic, f.o.b. Baltimore in bulk fines removed $62.70
Domestic, f.o.b. Chewalah, Wash., in bulk 36.30
in sacks 41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢... $13.75

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. 1952 prices not yet established. 1951 prices were:

Old range, bessemer	$8.70
Old range, nonbessemer	8.55
Mesabi, bessemer	8.45
Mesabi, nonbessemer	8.30
High phosphorus	8.30

After adjustments for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in Lake vessel rates, upper Lake rail freights, dock handling charges and taxes thereon.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+% Fe	44.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	60.0¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe.	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe.	83.0¢ to $1.48
Aluminum	31.5¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic	10.75¢ plus metal value
copper, reduced	10.00¢ plus metal value
Cadmium, 100-199 lb.	95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity, del'd	$3.50
Lead	7.5¢ to 12.0¢ plus metal value
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	88.0¢
Nickel, annealed	95.0¢
Nickel, spherical, unannealed	92.0¢
Silicon	38.5¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	83.00¢
Stainless steel, 316	$1.10
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$6.00
Zinc, 10 ton lots	23.0¢ to 30.5¢

Ferroalloy Prices

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk in carloads delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.50	0.20% C	29.50
0.10% C	30.00	0.50% C	29.25
0.15% C	29.75	1.00% C	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			22.00
62-66% Cr, 4-6% C, 6-9% Si			22.60

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.14
0.50% max. C	1.10
9 to 11% C	1.08

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.60¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

CMSZ

Contract price, cents per lb of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	20.75
Less ton lots	22.00

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50
Less ton lots	17.75

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00
Ton lots to carload packed	19.00
Less ton lots	20.50

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size.

F.o.b. Niagara Falls, Alloy, W. Va., Ashtabua, O.	$225
F.o.b. Johnstown, Pa.	$227
F.o.b. Sheridan, Pa.	$225
F.o.b. Etna, Clairton, Pa.	$228

Add $2.80 for each 1% above 82% Mn, subtract $2.80 for each 1% below 78% Mn.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	12.45
Ton lots, packed	14.05

Spiegeleisen

Contract prices gross ton; lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$84.00	$85.00
Pgh. or Chicago	84.00	85.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	36.95
Ton lots	38.45

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	30.00
Ton lots	32.00
Less ton lots	34.00 to 37.00

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	28.45	30.30	31.50
0.07% max. C	27.95	29.80	31.00
0.15% max. C	27.45	29.30	30.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	11.40
Ton lots	13.05
Briquet, contract basis carlots, bulk delivered, per lb of briquet	12.65
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $90.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	18.00
97% Si, 1% Fe	18.50

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.95
Ton lots	8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.30
50% Si	12.40	85% Si	15.55
90-95% Si			17.00

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

35-55% contract basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.

Carloads	9.90
Ton lots	11.30

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.15

Ferrocolumbium, 50-60% 2 in. x D, contract basis, delivered per pound contained Cb.

Ton lots	$4.90
Less ton lots	4.95

Ferro-Tantalum-Columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $3.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.32

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00

10 tons to less carload $75.00

Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagra Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50

Less ton lots 1.55

Ferrotitanium, 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $177.00

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W5, ton lots, delivered $5.00

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. $1.14

bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound

Carload, bulk lump	14.50¢
Ton lots, bulk lump	15.75¢
Less ton lots, lump	16.25¢

Vanadium Pentoxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.28

Zirconium, 35-40%, contract basis f.o.b. plant, freight allowed, per pound of alloy.

Ton lots	21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.

Carload, bulk	7.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B.... $5.35

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti, 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots, per pound	10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots.... $1.20

F.o.b. Wash., Pa.; 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.

No. 1	$1.00
No. 6	68¢
No. 79	50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered

Less ton lots	$1.80

Silcaz, contract basis, delivered.

Ton lots	45.00¢

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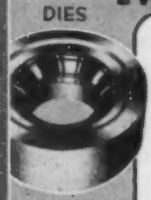

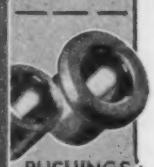

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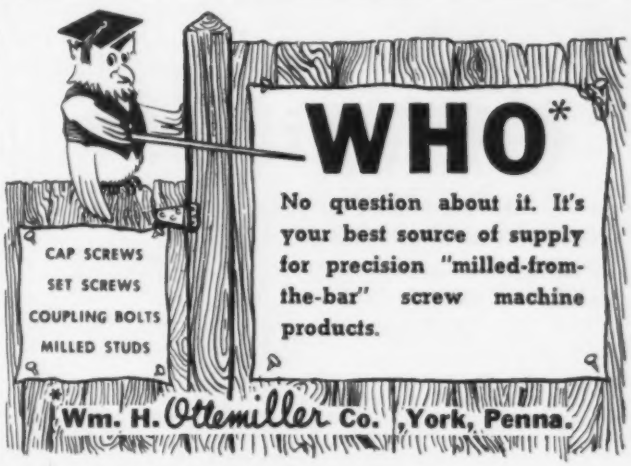

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Hill Clutch & Machine & Fdy. Co. Open Side Abrasive Belt Grinding Unit. Designed to accommodate slabs up to ¾" thick x 30" wide x 30' long.

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16' x ¾" Dreis & Krump Leaf Type Bending Brake, Motor Driven with 40 H.P. A.C. Motor.

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72'6" x 140' Steel Building—NEW—Designed for Corrugated Steel Siding and to carry load of 30 ton overhead electric traveling crane.

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6000 lb. Brosius Floor Type Gasoline Driven Charging Machine. Equipped with Peel, Gasoline Engine, Rubber Tires.

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5 ton Niles Crane 56' 3⅜" Span. Three motors, 440 volt, 3 phase, 60 cycle.

CRANE—GANTRY
5 ton Whiting Two Leg Gantry Crane 52 Ft. Span Cab Control. Three Motors 220 v. 3 ph. 60 cy.

FLANGING MACHINE
¾" McCabe Pneumatic Flanging Machine, Pneumatic Holddowns, Circle Flanging Attachment.

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5" Ajax Forging Machine or Upsetter, Motor driven. Equipped with Air Clutch.

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Surface Combustion Super Fast Heating Furnace Tangential Burner, 3 Section, Pusher Capacity 3600 lb. per hr. gross, Max. Temp. 2750° F. Complete Elecl. Equip.

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400 lb. Moore Type "UT" Melting Furnace Top Charge. Complete with Transformer. New 1943—Little Used.
15 ton Heroult Model V-12 Electric Melting Furnace Top Charge hydraulically operated. Complete with Transformer Equipment.
25 ton Moore Size "NT" Melting Furnace, with 7500 KVA Transformer 13,200 vo. 3 ph. 60 cy.

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60" Aetna-Standard Roller Leveler, Motor Driven. 17 Rolls 4⅜" Dia.

PLANERS
48" x 48" x 20' Cincinnati, Four Head
48" x 48" x 12' Niles-Bement-Pond, Four Head
60" x 60" x 12' Niles-Bement-Pond, Four Head
72" x 72" x 12' Niles-Bement-Pond, Four Head

PLATING MACHINE
Type "B" Crown Full Automatic, Nickel & Chrome Plating Machine, Max. Work Size 16" wide x 36" deep x 4" thick.

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1000 ton Bliss #27 Knuckle Joint, Embossing & Coining Press, 2½" stroke, 18" Shut Height.

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No. 3 Medart 3-Roll Straightening Machine Capacity 1" to 3½" Bars or 4½" O. D. Pipe or Tubing. NEW 1950.
No. 4 Kane Roach 8-Roll Straightener Capacities 2" Rounds or Squares, 3x3x⅜" Angles, 2½" Channels, etc.

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300,000 lb. SOUTHWARK-EMERY Universal Hydraulic Testing Machine.

TRIMMING LINE
#1049 Torrington Trimming Line, With Feed Rolls and Scrap Cutter. Capacity for steel or aluminum alloys ⅛" max. Trimmed width 22" min. 66" max. Scrap Length ¾" min. 2¾" max.

UNIVERSAL IRONWORKERS
Ryerson Steel Frame Universal Iron Worker, M.D. Capacity Punch ⅝" thru ⅝", Shear 1" Square 1¼" Round, ½" x 4" Flat, 4 x 4 x ¼" Angles.
No. 28U-30 Buffalo Armor Plate Universal Ironworker—Combination Punch, Shear & Bar Cutter. Motor Driven Capacities—Shear 3" Round, 2¾" Square, 5x1⅛" Flat, 5x5x⅝" Angles, 12"—31½# Beams, etc., Punch 1½" thru 1¼".

RITTERBUSH & COMPANY, INC.
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The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Reflected Glory—Continued good business in Detroit tool and die shops is causing some optimism in the used and rebuilt machinery market. These shops supply a substantial part of the market and their prosperity assures a reasonable amount of activity.

Evidence that the strong tool and die market in Detroit is not an isolated case is the business increase reported in a recent survey made by the National Tool & Die Mfrs. Assn. Survey showed that new orders, less cancellations received by contract tool and die shops for special dies, jigs, fixtures, molds, gages and special machines during May, increased 7 pct over the previous month. And May deliveries were 22 pct higher than for the same month last year.

The study shows that backlogs also grew in May, rising 3 pct over the April level. Although more recent figures are not available, report is that the upward trend is continuing. Most contract tool die shops are operating on a 50 to 60 hr work week and regard the business outlook as favorable.

No Shutdowns — While many small plants were forced to close or curtail production during the steel strike, busy tool and die shops were less seriously affected and continue to show interest in good tools that are available.

Small grinders and small lathes are needed in this market and they are in short supply.

It is still too early to determine how much the end of the steel strike will aid the trade, but most Detroit dealers report renewed interest and an increase in inquiries.

One of the larger dealers reported that business was picking up not only in inquiries but "in buying intent" if dealers can locate and obtain the machine the purchaser is after.

Don't Care — Most rebuilders and reconditioners, however, are in the position of not caring too much what the results of the steel strike termination are. They are shackled by the 10 pct price spread between "as is" and reconditioned machinery as established in the amended version of CPR 80 which they feel is too small a margin to encourage much reconditioning activity.

Since they are obligated to extend a 30-day guarantee on equipment sold, most of the machinery has to get a substantial going over. Often the work necessary to assure a valid guarantee costs too much to permit a decent profit.

Gave Up—One dealer who formerly did extensive reconditioning now uses his rebuilding shop for repair or servicing instead of reconditioning for resale. Many dealers who formerly handled both new and used machinery are finding the used market too tough and have almost dropped out of the field because of its intensity.

As reported in other industrial areas, the steel strike hurt smaller dealers most. They found their customers shut down or nearly so because of the lack of steel or due to the loss of their own market resulting from the paralysis that struck the auto plants. This also applied to dealers whose inventories were loaded with older tools.

Rentals Up—While machine tool purchasing in the Chicago area has fallen off slightly, rentals are moving at a lively pace. One large renter has placed 300 tools in renting factories and reports he is receiving an increasing number of inquiries.

Rebuilders Meet—American Rebuilders Assn. will resume its activities in the line of establishing standards for rebuilt electrical equipment and machine tools in September. First meeting is slated for Sept. 30 but location has not yet been picked. Meetings thereafter will be held on the last Tuesday of every other month.